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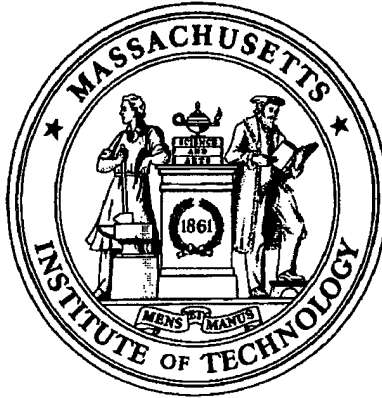
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13. ABSTRACT (Maximum 200 words) The MIT Research Laboratory of Electronics' Joint Services Program comprises seventeen work units (see below) that span a broad array of topics in high-speed optics, surface and phase transitions, submicron structures and quantum-effect devices, the electrical behavior of interconnect structures, and atomic and molecular physics. The work units include:  InGaAlAs Quantum Heterostructures for High-Performance Devices; Chemical Beam Epitaxy of II-VI/III-V Quantum Wells; Physics of InAlAs/InGaAs Heterostructure Field-Effect Transistors; Sub-100-Nanometer Structures: Technology, Electronics, and Optics; Single-Electron Electronics, Quantum Transport in Mesoscopic Systems; Statistical Mechanics of Quantum Dots; Single-Electron Microscopy; Femtosecond Quantum Optics; Ultrafast Optical and Electronic Processes; Excitations, Ground State Properties, and Phase Transitions of Surfaces; Synchrotron X-ray Studies of Semiconductor Surface Disorder; Step Structures and Epitaxy on Semiconductor Surfaces; Optical Frequency Metrology; Precision Physical Measurements; Ultracold Atoms; and Electromagnetic Waves in Complex Media.  Results of the research done under this contract are described in more detail in the attached "Overview."				
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**Research Laboratory of Electronics  
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**Submitted by  
Professor Jonathan Allen, Principal Investigator  
February 1998**

**Approved for public release;  
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**Overview of the  
MIT Research Laboratory of Electronics  
Joint Services Electronics Program  
Contract DAAH04-95-1-0038  
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The MIT Research Laboratory of Electronics Joint Services Program comprises seventeen work units that span a broad array of topics in high-speed optics, surface and phase transitions, submicron structures and quantum-effect devices, the electrical behavior of interconnect structures, and atomic and molecular physics.

The RLE program has developed and utilized state-of-the-art epitaxial growth techniques for high-performance devices that use indium gallium aluminum arsenide quantum heterostructures, as well as indium aluminum arsenide/indium gallium arsenide heterostructure field-effect transistors for high-speed, high-power telecommunication applications. The RLE program is unique in that it provides II-VI and III-V integrated growth facilities for a variety of projects, most notably the metalorganic molecular beam epitaxy of zinc selenide for blue light-emitter applications.

The RLE program continues to provide a strong array of capabilities in the sub-100-nanometer structure area, which is essential for our research in quantum-effect devices. Our x-ray nanolithography capability continues to expand. This will lead to the ability to grow extremely small MOSFETs with channels less than one-tenth of a micron in length. The acquisition of an electron beam lithographic capability has complemented our x-ray facilities. This has enhanced both our direct-write and mask masking capabilities.

Experiments with the single-electron transistor, which were previously reported, are aimed at developing new techniques to decrease the scale of these devices. This will enable these devices to operate at higher temperatures. Theoretical efforts have also been directed at single-electron transistors with a view towards understanding basic theory and revealing possibilities for new directions. The theoretical research is also focused on the statistical mechanics properties of quantum dots and how they can be utilized for new device applications.

Femtosecond optical capability is aimed at the provision of all-optical networks and all-optical switching by using compact, solid-state lasers that exhibit additive pulse modelocking. Soliton transmissions have been studied and implemented in these networks, thus permitting extremely long distances between repeaters in practical systems. The femtosecond optical capability is also utilized to probe electronic materials and to optimize transport properties in extremely fast electronic devices.

Surfaces are central to modern electronic and optical devices, and the RLE program continues its strong theoretical effort to characterize surface phase transitions, impurities, and stress. Realistic surface profiles are computed, and defect complexes on surfaces have been realistically characterized. Experimentally, synchrotron x-ray diffraction studies using high-power x-ray facilities have revealed new surface phenomena, including the ability to move plateaus on silicon surfaces through the introduction of surface currents. A detailed understanding of the atomic mechanisms of surface reconstruction has been obtained. The understanding of surface roughness, which is essential for many applications, has led to a better understanding of new fabrication techniques. By using accelerated neutral halogen atoms, surface reactions (similar to those

found in reactive ion etching) have been studied in detail. New techniques that avoid high pressure and associated surface defects have been devised for surface etching.

Many electronic and optical systems require extremely high-precision measurements and standards. The RLE JSEP program has pioneered the development of optical frequency standards. These developments can then be exploited in many electronic systems that involve the synchronization and coordination of worldwide systems. Highly accurate techniques to measure mass are now available for ultrahigh-resolution studies of electronic and optical materials. These techniques also provide a uniform and portable ultraprecision standard for mass.

RLE participates with other JSEP universities in electromagnetic studies. The focus at RLE is on propagation through multilayer media, such as that found in computer interconnect structures. Direct solutions in the time domain have provided a new understanding and the capability to decrease the delays imposed by these networks.

A continuing direction of the RLE program is the study and exploitation of individual atoms and molecules, as well as their contribution to the behavior of practical electronic and optical devices. The direct control of individual charge carriers is now feasible, and there is an increased understanding of possibilities for new quantum-effect devices based on cavity quantum electrodynamics in solid-state Coulomb blocking effects. The RLE program continues its efforts to realize new, practical devices with outstanding performance to exploit these effects.

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**Degrees Awarded under JSEP Support**  
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**InGaAlAs Quantum Heterostructures for High-Performance Devices**

Aggarwal, R.J. Ph.D., 1996  
Hoshino, I. Ph.D., 1997  
Peng, L.-H. Ph.D. (Harvard Univ.), 1994  
Smet, J.H. Ph.D., 1994

**Chemical Beam Epitaxy of II-VI/III-V Quantum Wells**

Ho, E. Ph.D., 1996  
Warlick, E.L. M.Eng., 1996

**Physics of InAlAs/InGaAs Heterostructure Field-Effect Transistors**

Adams, T. S.B., 1994  
Ernst, A. M.Eng., 1997  
Greenberg, D.R. Ph.D., 1995  
Putnam, C. M.Eng., 1997  
Reiner, J.W. S.B., 1994

**Sub-100-Nanometer Structures: Technology, Electronics, and Optics**

Burkhardt, M. Ph.D., 1995  
Damask, J.N. Ph.D., 1996  
Ferrera, J. S.B./S.M., 1994  
Hector, S.D. Ph.D., 1994  
Hu, H. Ph.D., 1994  
Jackson, K.M. S.M., 1996  
Kumar, A. Ph.D., 1994  
Li, H. S.B./S.M., 1994  
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Owen, G.M. S.M., 1994  
Shah, S. S.M., 1995  
Yang, I. Ph.D., 1996  
Yasaka, A. S.M., 1995  
Yee, K.W. S.M., 1996

**Single-Electron Electronics**

Abusch-Magder, D. Ph.D., 1997

**Quantum Transport in Mesoscopic Systems**

Chklovskii, D.B. Ph.D., 1994

**Statistical Mechanics of Quantum Dots**

Andreev, A. Ph.D., 1996  
Mucciolo, E.R. Ph.D., 1994

**Single-Electron Spectroscopy**

Silevitch, D.M. S.B., 1996  
Sokolinski, I. S.B., 1995

**Degrees Awarded under JSEP Support**  
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**Femtosecond Quantum Optics**

Boivin, L. Ph.D., 1996  
Lenz, G. Ph.D., 1995  
Singer, A.C. Ph.D., 1996  
Wong, V.V. Ph.D., 1995

**Ultrafast Optical and Electronic Processes**

Ramaswamy, M. Ph.D., 1994  
Sun, C.-K. Ph.D. (Harvard Univ.), 1994  
Ulman, M. Ph.D., 1994

**Excitations, Ground State Properties, and Phase Transitions of Surfaces**

Capaz, R. Ph.D., 1996  
Cho, K. Ph.D., 1994

**Synchrotron X-ray Studies of Semiconductor Surface Disorder**

Ramstad, M.J. Ph.D., 1996  
Young, M.J. Ph.D., 1996

**Step Structures and Epitaxy on Semiconductor Surfaces**

Song, S. Ph.D., 1996

**Optical Frequency Metrology**

Lutwak, R. Ph.D., 1996

**Precision Physical Measurements**

Chapman, M.S. Ph.D., 1995  
DiFilippo, F. Ph.D., 1994  
Hammond, T.D. Ph.D., 1997  
Martin, P.S. Ph.D., 1996  
Pelly, J.D. S.B., 1994  
Rusinkiewicz, S.M. S.B., 1995  
Tannian, B.E. S.B., 1994

**Ultracold Atoms**

Davis, K.B. Ph.D., 1995  
Entin, I.A. S.B., 1995  
Huang, E.W. S.B., 1996  
Mewes, M.-O. Ph.D., 1997  
Thompson, Jr., S.H. S.B., 1995  
Wan Morshidi, W.Y. S.B., 1994  
Yesley, P.S. S.B., 1995

**Electromagnetic Waves in Complex Media**

Johnson, J.T. Ph.D., 1996  
Li, K. Ph.D., 1995  
Tomisio, N. S.M., 1997  
Yan, J.K. S.M., 1996  
Yeang, C.-P. S.M., 1996

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

**Published Journal Articles**

- Abernathy, D.L., S. Song, K.I. Blum, R.J. Birgeneau, and S.G.J. Mochrie. "Chiral Melting of the Si(113) (3 x 1) Reconstruction." *Phys. Rev. B* 49: 2991 (1994).
- Adams, L.E. E.S. Kintzer, and J.G. Fujimoto, "Performance and scalability of an all-optical clock recovery figure eight laser," *Photonics Technol. Lett.* 8, 55-57, January 1996.
- Agam, O., B.L. Altshuler, and A.V. Andreev. "Spectral Statistics: From Disordered to Chaotic Systems." *Phys. Rev. Lett.* 75: 4389 (1995).
- Aggarwal, R.J. and C.G. Fonstad. "High Peak-to-Valley Current Ratio In<sub>0.22</sub>Ga<sub>0.78</sub>As/AlAs RTDs on GaAs using Relaxed In<sub>x</sub>Ga<sub>1-x</sub>As Buffers." *Electron. Lett.* 31: 75-76 (1995).
- Andreev, A.V., and B.L. Altshuler. "Spectral Statistics Beyond Random Matrix Theory." *Phys. Rev. Lett.* 75: 902-905 (1995).
- Andrews, M.R., C.G. Townsend, H.-J. Miesner, D.S. Durfee, D.M. Kurn, and W. Ketterle. "Observation of Interference between Two Bose Condensates." *Science* 275: 637-661 (1997).
- Andrews, M.R., D.M. Kurn, H.J. Miesner, D.S. Durfee, C.G. Townsend, S. Inouye, and W. Ketterle. "Propagation of Sound in a Bose-Einstein Condensate." *Phys. Rev. Lett.* 79(4): 553-556 (1997).
- Andrews, M.R., M.-O. Mewes, N.J. van Druten, D.S. Durfee, D.M. Kurn, and W. Ketterle. "Direct, Non-destructive Imaging of a Bose Condensate." *Science* 273: 84-87 (1996).
- Ashoori, R.C. "Electrons in Artificial Atoms." *Nature* 379: 413-419 (1996).
- Ashoori, R.C., H.L. Stormer, J.S. Weiner, L.N. Pfeiffer, K.W. Baldwin, and K.W. West. "Energy Levels of an Artificial Atom Probed with Single-Electron Capacitance Spectroscopy." *Surf. Sci.* 305: 558-565 (1994).
- Aucoin, R.J., and M.L. Schattenburg. "Optically-Matched Tri-Level Resist Process for Nanostructure Fabrication." *J. Vac. Sci. Technol. B* 13: 3007-3011 (1995).
- Bahl, S.R., and J.A. del Alamo. "Physics of Breakdown in InAlAs/n<sup>+</sup>InGaAs Heterostructure Field-Effect Transistors." *IEEE Trans. Electr. Dev.* 41 (12): 2268-2275 (1994).
- Bahl, S.R., J.A. del Alamo, J. Dickmann, and S. Schildberg. "Off-State Breakdown in InAlAs/InGaAs MODFET." *IEEE Trans. Electr. Dev.* 42 (1): 15-22 (1995).
- Barry, R.A., V.W.S. Chan, K.L. Hall, E.S. Kintzer, J.D. Moores, K.A. Rauschenbach, E.A. Swanson, L.A. Adams, C.R. Doerr, S.G. Finn, H.A. Haus, E.P. Ippen, W.S. Wong, and M. Haner. "All-Optical Network Consortium Ultrafast TDM Networks." *IEEE J. Selec. Areas in Commun.* 54: 999-1013 (1996).
- Bergman, K., H.A. Haus, E.P. Ippen, and M. Shirasaki. "Squeezing in a Fiber Interferometer with a Gigahertz Pump." *Opt. Lett.* 19: 290-292 (1994).
- Berman, D., N.B. Zhitenev, R.C. Ashoori, H.I. Smith, and M.R. Melloch. "The Single-Electron Transistor as a Charge Sensor for Semiconductor Applications" *J. Vac. Sci. Technol. B* 15(6): 2940-2945 (1997).



**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Berthold, G., E. Zanoni, C. Canali, M. Pavesi, M. Pecchini, M. Manfredi, S.R. Bahl, and J.A. del Alamo. "Impact Ionization and Light Emission in InAlAs/InGaAs Heterostructure Field-Effect Transistors." *IEEE Trans. Electr. Dev.* 42 (4): 752-759 (1995).
- Boivin, L. "The Sagnac Loop Squeezer at Zero Dispersion with a Finite Response Time for Kerr Non-linearity." *Phys. Rev. A* 52(1): 754-766 (1995).
- Boivin, L., and H.A. Haus. " $\chi^{(3)}$ -Squeezed Vacuum Generation without a Sagnac Interferometer." *Opt. Lett.* 21: 146-148 (1996).
- Boivin, L., F. X. Kärtner, and H.A. Haus. "Analytical Solution to the Quantum Field Theory of Self-phase Modulation with a Finite Response Time." *Phys. Rev. Lett.* 73: 240-243 (1994).
- Bouma, B., A. Gouveia-Neto, J.A. Izatt, J. Russell, R. Sierra, U. Keller, and J.G. Fujimoto. "Hybrid Modelocking of a Flashlamp Pumped Ti:Al<sub>2</sub>O<sub>3</sub> Laser." *Opt. Lett.* 19: 1858-1860 (1994).
- Bouma, B., and J.G. Fujimoto. "Compact Kerr-lens-mode Locked Resonators." *Opt. Lett.* 21: 134-136 (1996).
- Bouma, B., G.J. Tearney, S.A. Boppart, M.R. Hee, M.E. Brezinski, and J.G. Fujimoto. "High Resolution Optical Coherence Tomographic Imaging using a Modelocked Ti:Al<sub>2</sub>O<sub>3</sub> Laser Source." *Opt. Lett.* 20: 1-3 (1995).
- Bouma, B.E., G.J. Tearney, I.P. Bilinsky, B. Golubovic, and J.G. Fujimoto. "Self-phase-modulated Kerr-lens Mode-locked Cr:Forsterite Laser Source for Optical Coherence Tomography." *Opt. Lett.* 21: 1839-1841 (1996).
- Bozler, C.O., C.T. Harris, S.Rabe, D.D. Rathman, W.D. Goodhue, M.A. Hollis, and H.I. Smith. "Arrays of Gated Field-Emitter Cones having 0.32  $\mu$ m Tip-to-Tip Spacings." *J. Vac. Sci. Technol. B* 12: 629-632 (1994).
- Brommer, K., M. Calvan, A. Dal Pino, and J.D. Joannopoulos. "Theory of Adsorption of Atoms and Molecules on Si(111)-(7x7)." *Surf. Sci.* 314: 57 (1994).
- Burkhardt, M., H.I. Smith, D.A. Antoniadis, T.P. Orlando, M.R. Melloch, K.W. Rhee, and M.C. Peckerar. "Fabrication Using X-ray Nanolithography and Measurement of Coulomb Blockade in a Variable-Sized Quantum Dot." *J. Vac. Sci. Technol. B* 12: 3611-3613 (1994).
- Burkhardt, M., S. Silverman, H.I. Smith, D.A. Antoniadis, K.W. Rhee, and M.C. Peckerar. "Gap Control in the Fabrication of Quantum-Effect Devices using X-ray Nanolithography." *J. Microelectron. Eng.* 27: 307-310 (1995).
- Capaz, R., H. Lim, and J.D. Joannopoulos. "Ab initio Studies of GaN Epitaxial Growth on SiC." *Phys. Rev. B* 51: 17755 (1995).
- Capaz, R., K. Cho and J.D. Joannopoulos. "Signatures of Bulk and Surface Arsenic Antisite Defects in GaAs(110)." *Phys. Rev. Lett.* 75: 1811 (1995).
- Capaz, R.B., and J.D. Joannopoulos. "Unified Approach for the Calculation of Force Constants and Accelerated Convergence of Atomic Coordinates." *Phys. Rev. B* 54(19): 13402-13405 (1996).

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

- Carter, D.J.D., A. Pepin, M.R. Schweizer, H.I. Smith, and L.E. Ocola. "Direct Measurement of the Effect of Substrate Photoelectrons in X-ray Nanolithography." *J. Vac. Sci. Technol. B* 15: 2509-2513 (1996).
- Chan, H.B., P.I. Glicofridis, R.C. Ashoori, and M.R. Melloch. "Universal Linear Density of States for Tunneling into the Two-Dimensional Electron Gas in Magnetic Field." *Phys. Rev. Lett.* 79: 2867-2870 (1997).
- Chapman, M.S., C.R. Ekstrom, T.D. Hammond, J. Schmiedmayer, B.E. Tannian, S. Wehinger, and D.E. Pritchard. "Near Field Imaging of Atom Diffraction Gratings: the Atomic Talbot Effect." *Phys. Rev. A* 51: R14 (1995).
- Chapman, M.S., C.R. Ekstrom, T.D. Hammond, R.A. Rubenstein, J. Schmiedmayer, S. Wehinger, and D.E. Pritchard. "Optics and Interferometry with Na<sub>2</sub> Molecules." *Phys. Rev. Lett.* 74: 4783 (1995).
- Chapman, M.S., T.D. Hammond, A. Lenef, J. Schmiedmayer, R.A. Rubenstein, E. Smith, and D.E. Pritchard. "Photon Scattering from Atoms in an Atom Interferometer: Coherence Lost and Regained." *Phys. Rev. Lett.* 75: 3783 (1995).
- Chen, J.C., and K. Li. "Quartic Perfectly Matched Layers for Dielectric Waveguides and Gratings." *Microwave Opt. Tech. Lett.* 10(6): 319-323 (1995).
- Chinn, S.R., E.A. Swanson, and J.G. Fujimoto, "Optical coherence tomography using a frequency-tunable optical source," *Opt. Lett.* 22, 340-342, March 1997.
- Cho, K., and J.D. Joannopoulos. "Flipping Silicon Dimers on Si(100) using Scanning Tunneling Microscopy: A Theoretical Investigation." *Phys. Rev. B* 53: 4553 (1996).
- Cho, K., and J.D. Joannopoulos. "Mechanical Hysteresis on an Atomic Scale." *Surf. Sci.* 328: 320 (1995).
- Cho, K., and J.D. Joannopoulos. "Reversible Tip-induced Structural Modifications in Scanning Tip Microscopy." *Jpn. J. Appl. Phys.* 35: 3714 (1996).
- Cho, K., and J.D. Joannopoulos. "Tip-induced Modifications in Scanning Tunneling Microscopy and Atomic Force Microscopy." *Scanning Microsc.* 9: 381 (1995).
- Cho, K., J.D. Joannopoulos, and A.N. Berker. "Vicinal Si(100) Surfaces under External Strain." *Phys. Rev. B* 53: 1002 (1996).
- Cundiff, S.T., W.H. Knox, E.P. Ippen, and H.A. Haus. "Frequency-dependent Mode Size in Broadband Kerr-lens Mode Locking." *Opt. Lett.* 21: 662-664 (1996).
- Darwish, A.M., E.P. Ippen, H.Q. Le, J.P. Donnelly, and S.H. Groves. "Optimization of Four-Wave Mixing Conversion Efficiency in the Presence of Nonlinear Loss." *Appl. Phys. Lett.* 69: 737-739 (1996).
- Darwish, A.M., E.P. Ippen, H.Q. Le, J.P. Donnelly, S.H. Groves, and E.A. Swanson. "Short-pulse Wavelength Shifting by Four Wave Mixing in Passive InGaAsP/InP Waveguides." *Appl. Phys. Lett.* 68: 2038-2040 (1996).
- Davis, K.B., M.-O. Mewes, and W. Ketterle. "An Analytical Model for Evaporative Cooling of Atoms." *Appl. Phys. B* 60: 155-159 (1995).

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Davis, K.B., M.-O. Mewes, M.A. Joffe, M.R. Andrews, and W. Ketterle. "Evaporative Cooling of Sodium Atoms." *Phys. Rev. Lett.* 74: 5202 (1995); Erratum: *Phys. Rev. Lett.* 75: 2909 (1995).
- Davis, K.B., M.-O. Mewes, M.R. Andrews, N.J. van Druten, D.S. Durfee, D.M. Kurn, and W. Ketterle. "Bose-Einstein Condensation in a Gas of Sodium Atoms." *Phys. Rev. Lett.* 75: 3969-3973 (1995).
- Devenyi, A., K. Cho, T. Arias, J.D. Joannopoulos. "Adaptive Riemannian Metric for All-Electron Calculations." *Phys. Rev. B* 49: 13373 (1994).
- DiFilippo, F., V. Natarajan, M. Bradley, F. Palmer, S. Rusinkiewicz, and D.E. Pritchard. "Mass Spectrometry at 0.1 Part Per Billion for Fundamental Metrology." *IEEE Trans. Instrum. Meas.* 44(2): 550-552 (1995).
- DiFilippo, F., V. Natarajan, M. Bradley, F. Palmer, and D.E. Pritchard. "Accurate Atomic Mass Measurements from Penning Trap Mass Comparisons of Individual Ions." *Phys. Scr.* T59: 144-154 (1995).
- DiFilippo, F., V. Natarajan, K.R. Boyce, and D.E. Pritchard. "Accurate Atomic Masses for Fundamental Metrology." *Phys. Rev. Lett.* 73: 1481 (1994).
- Doerr, C.R., H.A. Haus, and E.P. Ippen. "Asynchronous Soliton Mode Locking." *Opt. Lett.* 19: 1958-1960 (1994).
- Doerr, C.R., H.A. Haus, E.P. Ippen, M. Shirasaki, and K. Tamura. "Additive Pulse Limiting." *Opt. Lett.* 19: 31-33 (1994).
- Doerr, C.R., W.S. Wong, H.A. Haus, and E.P. Ippen. "Additive-pulse Mode-locking/limiting Storage Ring." *Opt. Lett.* 19: 1747-1749 (1994).
- Donnelly, J.P., H.Q. Le, E.A. Swanson, S.H. Groves, A. Darwish, and E.P. Ippen. "Nondegenerate Four-Wave Mixing Wavelength Conversion in Low-Loss Passive InGaAsP/InP Quantum-Well Waveguides." *Photonics Technol. Lett.* 8: 623-625 (1996).
- Dougherty, D.J., F.X. Kärtner, H.A. Haus, and E.P. Ippen. "Measurement of the Raman Gain Spectrum of Optical Fibers." *Opt. Lett.* 20: 31-33 (1995).
- Dougherty, D.J., S.B. Fleischer, E.L. Warlick, J.L. House, G.S. Petrich, L.A. Kolodziejski, and E.P. Ippen. "Ultrafast Carrier Dynamics and Intervalley Scattering in ZnSe." *Appl. Phys. Lett.* 71(21): 3144-3146 (1997).
- Ekstrom, C.R., J. Schmiedmayer, M.S. Chapman, T.D. Hammond, and D.E. Pritchard. "Measurement of the Electric Polariability of Sodium with an Atom Interferometer." *Phys. Rev. A* 51: 3883 (1995).
- Ferrera, J., M.L. Schattenburg, and H.I. Smith. "Analysis of Distortion in Interferometric Lithography." *J. Vac. Sci. Technol. B* 14(6): 4009-4013 (1996).
- Fisher, P.A., E. Ho, J.L. House, G.S. Petrich, L.A. Kolodziejski, J. Walker, and N.M. Johnson. "P- and N-Type Doping of ZnSe: Effects of Hydrogen Incorporation." *J. Cryst. Growth* 150: 729-733 (1995).
- Fleischer, S.B., B. Pevzner, D.J. Dougherty, E.P. Ippen, M.S. Dresselhaus, and A.F. Hebard. "Phototransformation in Visible and Near-IR Femtosecond Pump-Probe Studies of C<sub>60</sub> Films." *Appl. Phys. Lett.* 69: 296-298 (1996).

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Fleischer, S.B., P. Pevzner, E.L. Warlick, J.L. House, G.S. Petrich, L.A. Kolodziejski, and E.P. Ippen. "Ultrafast Carrier Dynamics and Intervalley Scattering in ZnSe." *Appl. Phys. Lett.* 71: 3144-3146 (1997).
- Foxman, E.B., U. Meirav, P.L. McEuen, M.A. Kastner, O. Klein, P.A. Belk, D.M. Abusch, and S.J. Wind. "Crossover from Single- to Multilevel Transport in Artificial Atoms." *Phys. Rev. B* 50: 14193 (1994).
- Furusaki, A., and K.A. Matveev. "Coulomb Blockade Oscillations of Conductance in the Regime of Strong Tunneling." *Phys. Rev. Lett.* 75: 709 (1995).
- Furusaki, A., and K.A. Matveev. "Theory of Strong Inelastic Co-tunneling." *Phys. Rev. B.* 52 (23): 16676-16695 (1995).
- Golubovic, B., B.E. Bouma, G.J. Tearney, and J.G. Fujimoto, "Optical frequency domain reflectometry using rapid wavelength tuning of a Cr<sup>4+</sup>:forsterite laser," *Opt. Lett.* 22, 1704-1706, November 1997.
- Golubovic, B., B.E. Bouma, I.P. Bilinsky, J.G. Fujimoto, and V.P. Mikhailov. "Thin crystal, room-temperature, Cr<sup>4+</sup>:Forsterite Laser using Near-infrared Pumping." *Opt. Lett.* 21: 1-3 (1996).
- Grayson, M., D.C. Tsui, M. Shayegan, K. Hirakawa, R.A. Ghanbari, and H. I. Smith. "Far-infrared Emission from Hot Quasi-One-Dimensional Quantum Wires in GaAs." *Appl. Phys. Lett.* 67: 1564 (1995).
- Greenberg, D.R., and J.A. del Alamo. "Nonlinear Source and Drain Resistance in Recessed-Gate Heterostructure Field-Effect Transistors." *IEEE Trans. Electr. Dev.* 43 (8): 1304-1306 (1996).
- Greenberg, D.R., J.A. del Alamo, and R. Bhat. "Impact Ionization and Transport in the InAlAs/n<sup>+</sup>InP HFET." *IEEE Trans. Electr. Dev.* 42 (9): 1574-1582 (1995).
- Greven, M., R.J. Birgeneau, and U.J. Wiese. "Monte Carlo Study of Correlations in Quantum Spin Ladders." *Phys. Rev. Lett.* 77:1865 (1996).
- Gu, Q., M.A. Tassoudji, S.Y. Poh, R.T. Shin, and J.A. Kong. "Coupled Noise Analysis for Adjacent Vias in Multilayered Digital Circuits." *IEEE Trans. Circuits Syst.* 41(12): 796-804 (1994).
- Guo, J.Z.Y., G.K. Celler, J.R. Maldonado, and S.D. Hector. "Wavelength Dependence of Exposure Window and Resist Profile in X-Ray Lithography." *J. Vac. Sci. Technol. B* 12: 4044-4050 (1994).
- Hall, K.L., G. Lenz, A.M. Darwish and E.P. Ippen. "Subpicosecond Gain and Index Nonlinearities in InGaAsP Diode Lasers." *Opt. Commun.* 111: 589-612 (1994).
- Hammond, T.D., Pritchard, D.E., M.S. Chapman, A. Lenef, and J. Schmiedmayer. "Multiplex Velocity Selection for Precision Matter Wave Interferometry." *Appl. Phys. B* 60: 193 (1995).
- Hara, Y., R.G. Atkins, S.H. Yueh, R.T. Shin, J.A. Kong, and R. Kwok. "Application of Neural Networks for Sea Ice Classification in Polarimetric SAR Images." *IEEE Trans. Geosci. Remote Sens.* 33(3): 740-748 (1995).
- Haus, H.A. "From Classical to Quantum Noise." *J. Opt. Soc. Am. B* 12(11): 2019-2036 (1995).

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Haus, H.A., and F.X. Kärtner. "Optical Quantum Nondemolition Measurements and the Copenhagen Interpretation." *Phys. Rev. A* 53: 3785-3791 (1996).
- Haus, H.A., and M.J. Khan. "Gain-Distributed Feedback Filters." *J. Lightwave Technol.* 13(2): 261-274 (1995).
- Haus, H.A., and W.S. Wong. "Solitons in Optical Communications." *Rev. Mod. Phys.* 68(2): 423-444 (1996).
- Haus, H.A., D.J. Jones, E.P. Ippen, and W.S. Wong. "Theory of Soliton Stability in Asynchronous Modelocking." *J. Lightwave Technol.* 14: 622-627 (1996).
- Haus, H.A., E.P. Ippen, and K. Tamura. "Additive Pulse Modelocking in Fiber Lasers." *IEEE J. Quant. Electron.* 30: 200-208 (1994).
- Haus, H.A., F.I. Khatri, W.S. Wong, E.P. Ippen, and K.R. Tamura. "Interaction of Soliton with Sinusoidal Wave Packets." *IEEE J. Quantum Electron.* 32: 917-924 (1996).
- Haus, H.A., K. Tamura, L.E. Nelson, and E.P. Ippen. "Stretched-pulse Additive Pulse Mode-locking in Fiber Ring Lasers: Theory and Experiment." *J. Quantum Electron.* 31: 1-8 (1995).
- Haus, H.A., W.S. Wong, and F.I. Khatri. "Continuum Generation by Perturbation of Soliton." *J. Opt. Soc. Am. B* 14(2): 304-313 (1997).
- Hector, S.D., V.V. Wong, H.I. Smith, M.A. McCord, A. Wagner, and K.W. Rhee. "Printability of Sub-150 nm Features in X-ray Lithography: Theory and Experiments." *J. Vac. Sci. Technol. B* 12: 3965-3969 (1994).
- Hirayama, Y., J.H. Smet, L.H. Peng, C.G. Fonstad, and E.P. Ippen. "Feasibility of 1.55  $\mu\text{m}$  Intersubband Photonic Devices Using InGaAs/AlAs Pseudomorphic Quantum Well Structures." *Jpn. J. Appl. Phys.* 33: 890-895 (1994).
- Ho, E., G.S. Petrich, and L.A. Kolodziejski. "Comparison of Hydrogen Passivation of ZnSe:N Using Gas Source and Conventional Molecular Beam Epitaxy." *J. Cryst. Growth* 159: 266-270 (1996).
- Ho, E., P.A. Fisher, J.L. House, G.S. Petrich, and L.A. Kolodziejski. "The Doping of ZnSe Using Gas Source Molecular Beam Epitaxy." *SPIE Proc.* 2346: 61-69 (1994).
- Ho, E., P.A. Fisher, J.L. House, G.S. Petrich, L.A. Kolodziejski, J. Walker, and N.M. Johnson. "Hydrogen Passivation in Nitrogen and Chlorine-Doped ZnSe Films grown by Gas Source Molecular Beam Epitaxy." *Appl. Phys. Lett.* 66 (9): 1062-64 (1995).
- House, J.L., D.J. Dougherty, G.S. Petrich, L.A. Kolodziejski, and E.P. Ippen. "Growth and Characterization of ZnSe/GaAs Quantum Wells." *Appl. Surf. Sci.* 104-105: 472-478 (1996).
- Hu, H., J.B. Jacobs, J.E. Chung, and D.A. Antoniadis. "The Correlation between Gate Current and Substrate Current in 0.1  $\mu\text{m}$  NMOSFETs." *IEEE Electr. Dev. Lett.* 11: 418 (1994).
- Ippen, E.P. "Principles of Passive Mode Locking." *Appl. Phys. B* 58: 159-170 (1994).
- Jones, D.J., H.A. Haus, and E.P. Ippen. "Subpicosecond Solitons in an Actively Mode-Locked Fiber Laser." *Opt. Lett.* 21: 1818-1820 (1996).

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Jones, D.J., L.E. Nelson, H.A. Haus, and E.P. Ippen. "Diode-Pumped Environmentally Stable Stretched-Pulse Fiber Laser." *IEEE J. Quantum Electron.* 3:1076-1079 (1997).
- Kärtner, F.X., and L. Boivin. "Quantum Noise of the Fundamental Soliton." *Phys. Rev. A* 53: 454-466 (1996).
- Kärtner, F.X., D. Dougherty, H.A. Haus, and E.P. Ippen. "Raman Noise and Soliton Squeezing." *J. Opt. Soc. Am. B* 11: 1267-1276 (1994).
- Kastner, M.A. "Artificial Atoms: Their Physics and Potential Application." *FED Journal* 7: 3 (1996).
- Kastner, M.A. "Mesoscopic Physics with Artificial Atoms." *Comments Cond. Mat. Phys.* 17: 349 (1996).
- Kastner, M.A., O. Klein, C. de C. Chamon, D. Tang, D.M. Abusch-Magder, U. Meirav, X.-G. Wen, and S.J. Wind. "Exchange Effects in Artificial Atoms." *Jpn. J. Appl. Phys.* 34: 16 (1995).
- Ketterle, W. "Bose-Einstein Condensation in a Gas of Sodium Atoms." *Bull. Am. Phys. Soc.* 41: 1130 (1996).
- Ketterle, W. "Bose-Einstein Condensation in an Almost Ideal Gas." *Phys. Can.* 52: 90 (1996).
- Ketterle, W. "Bose-Einstein-Kondensation in Ultrakalten Atomaren Gasen." *Verh. Dtsch. Phys. Ges.* (VI) 31: 1131 (1996).
- Ketterle, W. "Evaporative Cooling of Magnetically Trapped Sodium." *Bull. Am. Phys. Soc.* 40: 1269 (1995).
- Ketterle, W., and M.-O. Mewes. "Bose-Einstein Condensates-A Novel Form of Quantum Matter." *IEEE LEOS Newsletter*, August 1996, 18-21.
- Ketterle, W., and M.-O. Mewes. "Bose-Einstein Kondensation in einem Gas von Natrium-Atomen." *Phys. Bl.* 52: 573-576 (1996).
- Ketterle, W., and N.J. van Druten. "Bose-Einstein Condensation of a Finite Number of Particles Trapped in One or Three Dimensions." *Phys. Rev. A* 54: 656-660 (1996).
- Khatri, F.I., G. Lenz, J.D. Moores, H.A. Haus, and E.P. Ippen. "Extension of Coupled-cavity Additive Pulse Mode-locked Laser Theory." *Opt. Commun.* 110: 131-136 (1994).
- Khatri, F.I., J.D. Moores, G. Lenz, and H.A. Haus. "Models for Self-limited Additive Pulse Modelocking." *Opt. Commun.* 114: 447-452 (1995).
- Kim, K.S., I. Park, S. Lee, K. Cho, J.Y. Lee, J. Kim, and J.D. Joannopoulos. "The Nature of a Wet Electron." *Phys. Rev. Lett.* 76: 956 (1996).
- Klein, O., C. de C. Chamon, D. Tang, D.M. Abusch-Magder, S.-G. Wen, M.A. Kastner, and S.J. Wind. "Exchange Effects in an Artificial Atom at High Magnetic Fields." *Phys. Rev. Lett.* 74: 785 (1995).
- Klein, O., D. Goldhaber-Gordon, C. de C. Chamon, and M.A. Kastner. "Magnetic-field Dependence of the Level Spacing of a Small Electron Droplet." *Phys. Rev. B* 53: R4221 (1996).

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

- Koontz, E.M., M.H. Lim, V.V. Wong, G.S. Petrich, L.A. Kolodziejski, H.I. Smith, K.M. Matney, G.D. U'Ren, and M.S. Goorsky. "Preservation of Rectangular-patterned InP Gratings Overgrown by Gas Source Molecular Beam Epitaxy." *Appl. Phys. Lett.* 71(10): 1400-1402 (1997).
- Kokorowski, D.A., and D.E Pritchard. "Longitudinal Quantum Beam tomography." *J. Modern Opt.* 44: 2575-2581 (1997).
- Lee, C.F., B.J. McCartin, R.T. Shin, and J.A. Kong. "A Triangular-grid Finite-difference Time-domain Method for Electromagnetic Scattering Problems." *J. Electromag. Waves Appl.* 8(4): 449-470 (1994).
- Lee, S., S.J. Lee, J.Y. Lee, J. Kim, K.S. Kim, I. Park, K. Cho, and J.D. Joannopoulos. "Ab initio Study of Water Hexamer Anions." *Chem. Phys. Lett.* 254: 128 (1996).
- Lenef, A., T.D. Hammond, E.T. Smith, M.S. Chapman, R.A. Rubenstein, and D.E. Pritchard. "Rotation Sensing with an Atom Interferometer." *Phys. Rev. Lett.* 78: 760 (1997).
- Lenz, G. "Far-Field Diffraction of Truncated Higher-Order Laguerre-Gaussian Beams." *Opt. Commun.* 123: 423-429 (1996).
- Lenz, G., E.P. Ippen, J.M. Wiesenfeld, M.A. Newkirk and U. Koren. "Femtosecond Dynamics of the Nonlinear Anisotropy in Polarization Insensitive Semiconductor Optical Amplifiers." *Appl. Phys. Lett.* 68: 2933-2935 (1996).
- Lenz, G., K. Tamura, H.A. Haus and E.P. Ippen. "All-Solid-State Femtosecond Source at 1.55 $\mu$ m." *Opt. Lett.* 19(11): 1289-1291 (1995).
- Lenz, G., W. Gellerman, D.J. Dougherty, K. Tamura, and E.P. Ippen. "Femtosecond Fiber Laser Pulses Amplified by a KCl:Ti<sup>+</sup> Color-center Amplifier for Continuum Generation in the 1.5  $\mu$ m Region." *Opt. Lett.* 21: 137-139 (1996).
- Li, K., M.A. Tassoudji, S.Y. Poh, M. Tsuk, R.T. Shin, and J.A. Kong. "FD-TD Analysis of Electromagnetic Radiation from Modules-on-Backplane Configurations." *IEEE Trans. Electromag. Compatibil.* 37(3): 326-332 (1995).
- Lim, H., K. Cho, I. Park, J.D. Joannopoulos and E. Kaxiras. "Ab initio Study of Hydrogen Adsorption on Si(111)-7x7." *Phys. Rev. B* 52: 17231 (1995).
- Lim, H., K. Cho, R.B. Capaz, J.D. Joannopoulos, K.D. Brommer, and B.E. Larson. "Ab initio Studies of Adatom Vacancies on the Si(111)-(7x7) Surface." *Phys. Rev. B* 53: 15421 (1996).
- Little, B.E., and H.A. Haus. "A Variational Coupled-Mode Theory for Periodic Waveguides." *IEEE J. Quantum Electron.* 31: 2258 (1995).
- Longhi, S., G. Steinmeyer, and W.S. Wong. "Variational Approach to Pulse Propagation in Parametrically Amplified Optical Systems." *J. Opt. Soc. Am. B* 14(8): 2167-2173 (1997).
- Lutwak, R., J. Holley, P.P. Chang, S. Paine, D. Kleppner, and T. Ducas. "Circular States of Atomic Hydrogen." *Phys. Rev. A* 56(2): 1443-1452 (1997).
- Margalit, M., M. Orenstein, and H.A. Haus. "Injection Locking of a Passively Mode-locked Laser." *IEEE J. Quantum Electron.* 32: 155-160 (1996).

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

- Martin, P.S., J.C. Chen, C.G. Fonstad, and H.A. Haus. "Application of the Spectral Index Method to Laser Diode Design." *J. Lightwave Technol.* 13: 569-574 (1995).
- Matsumoto, M., and H.A. Haus. "Stretched-Pulse Optical Fiber Communications." *IEEE Photonics Technol. Lett.* 9(6): 785-787 (1997).
- Matveev, K.A. "Change Fluctuations Under the Coulomb Blockade Conditions." *Physica B* 203: 404 (1994).
- Matveev, K.A. "Coulomb Blockade at Almost Perfect Transmission." *Phys. Rev. B* 51: 1743 (1995).
- Matveev, K.A., and L.I. Glazman. "Coulomb Blockade of Activated Conduction." *Phys. Rev. B* 54: 10339 (1996).
- Matveev, K.A., L.I. Glazman, and H.U. Baranger. "Coulomb Blockade of Tunneling through a Double Quantum Dot." *Phys. Rev. B* 54: 5637 (1996).
- Matveev, K.A., L.I. Glazman, and H.U. Baranger. "Tunneling Spectroscopy of Quantum Charge Fluctuations in the Coulomb Blockade." *Phys. Rev. B* 53: 1034 (1996).
- Mewes, M.-O., M.R. Andrews, D.M. Kurn, D.S. Durfee, C.G. Townsend, and W. Ketterle. "An Output Coupler for Bose Condensed Atoms." *Phys. Rev. Lett.* 78: 582-585 (1997).
- Mewes, M.-O., M.R. Andrews, N.J. van Druten, D.M. Kurn, D.S. Durfee, C.G. Townsend, and W. Ketterle. "Collective Excitations of a Bose-Einstein Condensate in a Magnetic Trap." *Phys. Rev. Lett.* 77: 988-991 (1996).
- Mewes, M.-O., M.R. Andrews, N.J. van Druten, D.M. Kurn, D.S. Durfee, and W. Ketterle. "Bose-Einstein Condensation in a Tightly Confining DC Magnetic Trap." *Phys. Rev. Lett.* 77: 416-419 (1996).
- Mochrie, S.G.J., S. Song, M. Yoon, D.L. Abernathy, and G.B. Stephenson. "Faceting of Stepped Silicon (113) Surfaces: Self Assembly of Nanoscale Gratings." *Physica B* 221: 105 (1996).
- Mondol, M., H. Li, G. Owen, and H.I. Smith. "Uniform-Stress Tungsten on X-ray Mask Membranes via He-Backside Temperature Homogenization." *J. Vac. Sci. Technol. B* 12: 4024-4027 (1994).
- Moolji, A.A., S.R. Bahl, and J.A. del Alamo. "Impact Ionization in InAlAs/InGaAs HFETs." *IEEE Electr. Dev. Lett.* 15: 313 (1994).
- Moon, E.E., P.N. Everett, and H.I. Smith. "Immunity to Signal Degradation by Overlayers Using a Novel Spatial-Phase-Matching Alignment System." *J. Vac. Sci. Technol. B* 13: 2648-2652 (1995).
- Moon, E.E., P.N. Everett, K. Rhee, and H.I. Smith. "Simultaneous Measurement of Gap and Superposition in a Precision Aligner for X-ray Nanolithography." *J. Vac. Sci. Technol. B* November/December 1996.
- Moore, J.D., W.S. Wong, and H.A. Haus. "Stability and Timing Maintenance in Soliton Transmission and Storage Rings." *Opt. Commun.* 113: 153-175 (1994).



**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Mucciolo, E., R. Capas, B. Altshuler and J.D. Joannopoulos. "Manifestation of Quantum Chaos in Electronic Band Structures." *Phys. Rev. B* 50: 8245 (1994).
- Namiki, S., C.X. Yu, and H.A. Haus. "Observation of Nearly Quantum-limited Timing Jitter in an All-Fiber Ring Laser." *J. Opt. Soc. Am.* 13(12): 2817-2823 (1996).
- Namiki, S., E.P. Ippen, H.A. Haus, and C.X. Yu. "Energy Rate Equations for Mode-Locked Lasers." *J. Opt. Soc. Am. B* 14: 2099-2111 (1997).
- Namiki, S., E.P. Ippen, H.A. Haus, and K. Tamura. "Relaxation Oscillation Behavior in Polarization Additive Pulse Mode-Locked Fiber Ring Lasers." *Appl. Phys. Lett.* 26: 3969-3971 (1996).
- Natarajan, V., F. DiFilippo, and D.E. Pritchard. "Squeezing of a Classical Oscillator for Sub-thermal Noise Operation." *Phys. Rev. Lett.* 74: 2855 (1995).
- Nelson, L.E., D.J. Jones, K. Tamura, H.A. Haus, and E.P. Ippen. "Ultrashort-pulse Fiber Ring Lasers." *Appl. Phys. B* 65: 277-294 (1997).
- Nelson, L.E., E.P. Ippen, and H.A. Haus. "Broadly Tunable Sub-500 fs Pulses from an Additive-pulse Mode-locked Thulium-doped Fiber Ring Laser." *Appl. Phys. Lett.* 67: 19-21 (1995).
- Nelson, L.E., S.B. Fleischer, G. Lenz, and E.P. Ippen. "Efficient Frequency Doubling of a Femtosecond Fiber Laser." *Opt. Lett.* 21: 1759-1760 (1996).
- Nghiem, S.V., R. Kwok, S.H. Yueh, J.A. Kong, C.C. Hsu, M.A. Tassoudji, and R.T. Shin. "Polarimetric Scattering from Layered Media with Multiple Species of Scatterers." *Radio Sci.* 30(4): 835-852 (1995).
- Nghiem, S.V., R. Kwok, J.A. Kong, R.T. Shin, S.A. Arcone, and A.J. Gow. "An Electrothermodynamic Model with Distributed Properties for Effective Permittivities of Sea Ice." *Radio Sci.* 31(2): 297-311 (1996).
- Nuttall, W.J., D.Y. Noh, B.O. Wells, and R.J. Birgeneau. "Isothermal Melting of Near-Monolayer Xenon on Single Crystal Graphite." *J. Phys. Cond. Matt.* 7: 4337 (1995).
- Nuttall, W.J., D.Y. Noh, B.O. Wells, and R.J. Birgeneau. "Synchrotron X-ray Scattering Study of the Pressure Melting of near-Monolayer Xenon on Single Crystal Graphite at 140K." *Surf. Sci.* 307-309: 768 (1994).
- Oates, J.H., and R.T. Shin. "Modeling Multiple Interacting Small Aperture EMI Applications using the Finite-Difference Time-Domain Technique." *Progress In Electromagnetic Research* 12 (4): 75-105 (1996).
- Oates, J.H., R.T. Shin, and M.J. Tsuk. "Small Aperture Modeling for EMI Applications Using the FDTD Technique." *J. Electromag. Waves Appl.* 9(1/2): 326-332 (1995).
- Puliafito, C.A., M.R. Hee, C.P. Lin, E. Reichel, J.S. Schuman, J.S. Duker, J.A. Izatt, E.A. Swanson, and J.G. Fujimoto. "Imaging of Macular Diseases with Optical Coherence Tomography." *Ophthalmol.* 102: 217-229 (1995).
- Ramaswamy-Paye, M., and J.G. Fujimoto. "Compact Dispersion-Compensating Geometry for Kerr-lens Modelocked Femtosecond Lasers." *Opt. Lett.* 19: 1756-1758 (1994).

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Rooks, M.J., R.C. Tiberio, M. Chapman, T. Hammond, E. Smith, A. Lenef, R. Rubenstein, D. Pritchard, S. Adams, J. Ferrera, J.M. Carter, and H.I. Smith. "Coherence and Structural Design of Free-Standing Gratings for Atom-Wave Optics." *Jpn. J. Appl. Phys.* 34: 6935-6939 (1995).
- Rooks, M.J., R.C. Tiberio, M. Chapman, T. Hammond, E. Smith, A. Lenef, R. Rubenstein, and D. Pritchard. "Coherence of Large Gratings and Electron-beam Fabrication Techniques for Atom-wave Interferometry." *J. Vac. Sci. Technol. B* 13(6): 2745 (1995).
- Sanders, G.D., C.-K. Sun, B. Golubovic, J.G. Fujimoto, and C.J. Stanton. "Carrier-carrier Scattering in the Gain Dynamics of  $\text{In}_x\text{Ga}_{1-x}\text{As}/\text{Al}_y\text{Ga}_{1-y}\text{As}$  Diode Lasers." *Phys. Rev. B* 54: 8005-8020 (1996).
- Savas, T.A., S.N. Shah, M.L. Schattenburg, J.M. Carter, and H.I. Smith. "Achromatic-Interferometric Lithography for 100nm-Period Gratings and Grids." *J. Vac. Sci. Technol. B* 13: 2732-2735 (1995).
- Savas, T.A., M.L. Schattenburg, J.M. Carter, and H.I. Smith. "Large-Area Achromatic Interferometric Lithography for 100 nm-Period Gratings and Grids." *J. Vac. Sci. Technol. B* 14(6): 4167-4170 (1996).
- Schmiedmayer, J., C.R. Ekstrom, M.S. Chapman, T.D. Hammond, and D.E. Pritchard. "Magnetic Coherences in Atom Interferometry." *J. Phys. (France)* 4: 2029 (1994).
- Schmiedmayer, J., M.S. Chapman, C.R. Ekstrom, T.D. Hammond, Stefan Wehinger, and D.E. Pritchard. "Index of Refraction of Various Gases for Sodium Matter Waves." *Phys. Rev. Lett.* 74(7): 1043-1047 (1995).
- Scott, T.P., N. Smith, P.D. Magill, D.E. Pritchard, and B. Stewart. "Velocity Dependence of Quasi-resonant Vibrotational Transfer in  $\text{Li}_2$ -Rare Gas Collisions." *J. Phys. Chem.* 100(19): 7981-7988 (1996).
- Shaw, J.A., J.B. Delos, M. Courtney, and D. Kleppner. "Recurrences Associated with Classical Orbits." *Phys. Rev. A* 52: 3695 (1995).
- Shirasaki, M., I. Lyubomirsky, and H.A. Haus. "Noise Analysis of Mach-Zehnder Squeezer for Non-classical Input State." *J. Opt. Soc. Am. B* 11: 857-863 (1994).
- Smet, J.H., C.G. Fonstad, and Q. Hu. "Intrawell and Interwell Intersubband Transitions in Multiple Quantum Wells for Far-Infrared Sources." *J. Appl. Phys.* 79: 9305-9320 (1996).
- Smet, J.H., L.H. Peng, Y. Hirayama, and C.G. Fonstad. "Electron Intersubband Transitions to 0.8 eV (1.55  $\mu\text{m}$ ) in  $\text{InGaAlAs}/\text{AlAs}$  Single Quantum Wells." *Appl. Phys. Lett.* 64: 986-987 (1994).
- Smith, H.I. "100 Years of X-rays: Impact on Micro- and Nanofabrication." *J. Vac. Sci. Technol. B* 13: 2323-2328 (1995).
- Smith, H.I. "X-ray Lithography for Microelectronics." *Phys. Scr.* 61: 26-31 (1996).
- Smith, H.I., "A Proposal for Maskless, Zone-Plate-Array Nanolithography." *J. Vac. Sci. Technol. B* 14: 4318-4322 (1996).
- Smith, H.I., and F. Cerrina. "Will X-ray Lithography be Implemented in ULSI Manufacturing?" *Micro-lithography World*, January 1997.

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

- Smith, H.I., M.L. Schattenburg, S.D. Hector, J. Ferrera, E.E. Moon, I.Y. Yang, and M. Burkhardt. "X-ray Nanolithography: Extension to the Limits of the Lithographic Process." *Microelectron. Engin.* 32: 143-158 (1996).
- Somerville, M.H., D.R. Greenberg, and J.A. del Alamo. "Temperature and Carrier Concentration Dependence of Mobility in a Heavily-Doped Quantum Well." *Appl. Phys. Lett.* 64 (24): 3276-3278 (1994).
- Somerville, M.H., J.A. del Alamo, and W. Hoke. "Direct Correlation Between Impact Ionization and the Kink Effect in InAlAs/InGaAs HEMTs." *IEEE Electr. Dev. Lett.* 17: 473 (1996).
- Song, S., and S.G.J. Mochrie. "Tricriticality and Faceting in the Orientational Phase Diagram of Stepped Si(113) Surfaces." *Phys. Rev. B* 51: 10068 (1995).
- Song, S., and S.G.J. Mochrie. "Tricriticality in the Orientational Phase Diagram of Stepped Si(113) Surfaces." *Phys. Rev. Lett.* 73: 995 (1994).
- Song, S., M. Yoon, and S.G.J. Mochrie. "Faceting, Tricriticality, and Attractive Interactions between Steps in the Orientational Phase Diagram of Silicon Surfaces between [113] and [5 5 12]." *Surf. Sci.* 334: 153 (1995).
- Song, S., M. Yoon, S.G.J. Mochrie, and G.B. Stephenson. "Faceting Kinetics of Stepped Si(113) Surfaces: Dynamic Scaling and Nano-scale Grooves." *Surf. Sci.* 372: 37 (1997).
- Song, S., S.G.J. Mochrie, and G.B. Stephenson. "Faceting Kinetics of Stepped Si(113) Surfaces: A Time-resolved X-ray Scattering Study." *Phys. Rev. Lett.* 74: 5240 (1995).
- Sun, C.-K., B. Golubovic, H.-K. Choi, C.A. Wang, and J.G. Fujimoto. "Femtosecond Investigations of Spectral Hole Burning in Semiconductor Lasers." *Appl. Phys. Lett.* 66(13): 1650-1652 (1995).
- Sun, C.-K., B. Golubovic, J.G. Fujimoto, H.K. Choi, and C.A. Wang. "Heterodyne Nondegenerate Pump-probe Measurement Technique for Guided Wave Devices." *Opt. Lett.* 20: 210-212 (1995).
- Sun, C.-K., F. Vallee, L. Acioli, E.P. Ippen, and J.G. Fujimoto. "Femtosecond-tunable Measurement of Electron Thermalization in Gold." *Phys. Rev. B* 50 (20): 337-348 (1994).
- Tamura, K., C.R. Doerr, H.A. Haus, and E.P. Ippen. "Soliton Fiber Ring Laser Stabilization and Tuning with a Broad Intracavity Filter." *IEEE Photonics Technol. Lett.* 6: 697-699 (1994).
- Tamura, K., C.R. Doerr, L. Nelson, H.A. Haus, and E.P. Ippen. "Technique for Obtaining High-energy Ultrashort Pulses from an Additive-pulse Mode-locked Erbium-doped Fiber Ring Laser." *Opt. Lett.* 19: 46-48 (1994).
- Tamura, K., E.P. Ippen, and H.A. Haus. "Optimization of Filtering in Soliton Fiber Lasers." *IEEE Photonics Technol. Lett.* 6: 1433-1435 (1994).
- Tamura, K., E.P. Ippen, and H.A. Haus. "Pulse Dynamics in Stretched-pulse Fiber Lasers." *Appl. Phys. Lett.* 67: 158-160 (1995).
- Tamura, K., L.E. Nelson, H.A. Haus, and E.P. Ippen. "Soliton versus Non-soliton Operation of Fiber Ring Lasers." *Appl. Phys. Lett.* 62: 149-151 (1994).

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Taniguchi, N., A.V. Andreev, and B.L. Altshuler. "Statistics of Oscillator Strength in Chaotic Systems." *Europhysics Lett.* 29: 515 (1995).
- Taniguchi, N., B.S. Shastry, and B.L. Altshuler. "Random Matrix Model and Calogero-Sutherland Model: A Novel Current-Density Mapping." *Phys. Rev. Lett.* 75: 37 (1995).
- Tepesch, P.D., A.F. Kohan, G.D. Garbulsky, G. Ceder, C. Coley, H.T. Stokes, L.L. Boyer, M.J. Mehl, B.P. Burton, K. Cho, and J.D. Joannopoulos. "A Model to Compute Phase Diagrams in Oxides with Empirical or First-principles Energy Methods and Application to the Solubility Limits in the CaO-MgO System." *J. Am. Ceram. Soc.* 79: 2033 (1996).
- Tong, Y.P., P.M.W. French, J.R. Taylor, J.G. Fujimoto, "All-solid-state femtosecond sources in the near infrared," *Opt. Commun.* 136, 235-238, March 1997.
- Townsend, C.G., N.J. van Druten, M.R. Andrews, D.S. Durfee, D.M. Kurn, M.-0. Mewes, and W. Ketterle. "Bose-Einstein Condensation of a Weakly-interacting Gas." *J. Opt. Soc. Am.* 7: 2-13 (1997).
- Townsend, C.G., W. Ketterle, and S. Stringari. "Bose-Einstein Condensation." *Phys. World* 29-34 (March 1997).
- Tsang, L., K.H. Ding, G. Zhang, C. Hsu, and J.A. Kong. "Backscattering Enhancement and Clustering Effects of Randomly Distributed Dielectric Cylinders Overlying a Dielectric Half Space Based on Monte Carlo Simulation." *IEEE Trans. Antennas Propag.* 43(5): 488-499 (1995).
- van Druten, N.J., and W. Ketterle. "Two-step Condensation of the Ideal Bose Gas in Highly Anisotropic Traps." *Phys. Rev. Lett.* 79(4): 549-552 (1997).
- Wang, H., J. Luo, K.V. Shenoy, Y. Royter, C.G. Fonstad, and D. Psaltis. "Monolithic Integration of SEEDs and VLSI GaAs Circuits by Exptaxy on Electronics." *IEEE Photonics Tech. Lett.* 9: 607-609 (1997).
- Warlick, E.L., E. Ho, G.S. Petrich, and L.A. Kolodziejski. "Reducing the Defect Density in MBE-ZnSe/III-V Heterostructures." *J. Cryst. Growth.* 175/176: 564-570 (1997).
- Wong, V.V., A. Yasaka, and H.I. Smith. "Resist Planarization over Topography using Ion Implantation." *J. Vac. Sci. Technol. B* 13: 2797-2800 (1995).
- Wong, V.V., J. Ferrera, J. Damask, J. Carter, E. Moon, H.A. Haus, H.I. Smith, and S. Rishton. "Spatial-Phase Locked E-Beam Lithography and X-ray Lithography for Fabricating First-Order Gratings on Rib Waveguides." *J. Vac. Sci. Technol. B* 12: 3741-3745 (1994).
- Wong, V.V., J. Ferrera, J.N. Damask, J.M. Carter, E.E. Moon, H.A. Haus, H.I. Smith, and S. Rishton. "Spatial-phase-locked E-beam Lithography and X-ray Lithography for Fabricating First-order Gratings on Rib Waveguides." *J. Vac. Sci. Technol. B* 12(6): 3741-3745 (1994).
- Wong, V.V., J. Ferrera, J.N. Damask, T.E. Murphy, and H.I. Smith. "Distributed Bragg Grating Integrated Optical Filters: Synthesis and Fabrication." *J. Vac. Sci. Technol. B* 13: 2859-2864 (1995).
- Wong, W.S., S. Namiki, M. Margalit, H.A. Haus, and E.P. Ippen. "Self-switching of Optical Pulses in Dispersion-Imbalanced Nonlinear Loop Mirrors." *Opt. Lett.* 22(15): 1150-1152 (1997).

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Xia, J., A.K. Jordan, and J.A. Kong. "Electromagnetic Inverse Scattering Theory for Inhomogeneous Dielectric: The Local Reflection Model." *J. Opt. Soc. Am. A* 11(3): 1081-1086 (1994).
- Xia, J.J., T.M. Habashy, and J.A. Kong. "Profile Inversion in a Cylindrically Stratified Lossy Medium." *Radio Sci.* 29(4): 1131-114 (1994).
- Yang, I., H. Hu, L.T. Su, V.V. Wong, M. Burkhardt, E. Moon, J. Carter, D.A. Antoniadis, H.I. Smith, K.W. Rhee, and W. Chu. "High Performance Self-Aligned Sub-100 nm MOSFETs Using X-ray Lithography." *J. Vac. Sci. Technol. B* 12: 4051-4054 (1994).
- Yang, I., Y. Yang, J.M. Carter, S.E. Silverman, S. Rishton, D.A. Antoniadis, and H.I. Smith. "Combining and Matching Optical E-beam and X-ray Lithographies in the Fabrication of Si CMOS Circuits with 0.1 and Sub-0.1  $\mu\text{m}$  Features." *J. Vac. Sci. Technol. B* 13: 2741-2744 (1995).
- Yang, I.Y., D.A. Antoniadis, and H.I. Smith. "Fabrication of Back-gated CMOS Devices Using Mixed and Matched Optical and X-ray Lithographies." *J. Vac. Sci. Technol. B*, 14: 4024-4028 (1996).
- Zeiger, H.J., T.K. Cheng, E.P. Ippen, G. Dresselhaus, and M.S. Dresselhaus. "Femtosecond Studies of the Phase Transition in  $\text{Ti}_2\text{O}_3$ ." *Phys. Rev. B* 54: 105-123 (1996).
- Zhao, Y., D.C. Tsui, M.B. Santos, M. Shayegan, R.A. Ghanbari, D.A. Antoniadis, and H.I. Smith. "Grating-Induced Cyclotron-Resonance Anomaly in  $\text{GaAs}/\text{Al}_x\text{Ga}_{1-x}\text{As}$  Heterostructures." *Phys. Rev. B* 51: 174 (1995).
- Zhitenev, N.B., M. Brodsky, R.C. Ashoori, and M.R. Melloch. "A New Class of Resonances at the Edge of the Two-Dimensional Electron Gas." *Phys. Rev. Lett.* 77: 1833-1836 (1997).
- Zhitenev, N.B., R.C. Ashoori, L.N. Pfeiffer, and K.W. West. "Periodic and Aperiodic Bunching in the Addition Spectra of Quantum Dots." *Phys. Rev. Lett* 79: 2308-2311 (1997)..

**Journal Articles Accepted or Submitted for Publication**

- Ahadian, J.F., S.G. Patterson, Y. Royter, G.S. Petrich, L.A. Kolodziejski, C.G. Fonstad, P.T. Vaidyanathan, S. Prasad, D. Mull, and W.D. Goodhue. "Practical OEICs Based on the Monolithic Integration of GaAs/InGaP LEDs with Commercial GaAs VLSI Electronics. Submitted for publication.
- Andrews, M.R., D.S. Durfee, S. Inouye, D.M. Kurn, H.-J. Miesner, and W. Ketterle. "Studies of Bose-Einstein Condensates." *J. Low Temp. Phys.*
- Berman, D., N.B. Zhitenev, R.C. Ashoori, H.I. Smith, M.R. Melloch. "Single-Electron Transistor as a Charge Sensor for Semiconductor Applications." *J. Vac. Sci. Technol. B.*
- Bouma, B.E., M. Ramaswamy-Paye, and J.G. Fujimoto. "Compact Resonator Designs for Mode-locked Solid-state Lasers." *Appl. Phys. B*
- Brodsky, M., N.B. Zhitenev, R.C. Ashoori, and M.R. Melloch. "An Anomalous Skin Effect for Composite Fermions." *Phys. Rev. B Rapid Comm.*

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Cho, K., and J.D. Joannopoulos. "Intrinsic Surface Atom Manipulations in STM and AFM." *Appl. Surf. Sci.*
- Kärtner, F.X., and L. Boivin. "Quantum Noise of the Fundamental Soliton." *Phys. Rev. A.*
- Ketterle, W., and H-J. Miesner. "Coherence Properties of Bose Condensates and Atom Lasers." *Phys. Rev. A*
- Oates, J.H., and R.T. Shin. "Analytical Evaluation of Finite-Difference Time-Domain Transmission Line Properties." *J. Electromag. Waves Appl.*
- Somerville, M.H., J.A. del Alamo, and W. Hoke. "Barrier-Induced Hole Pileup: A New Physical Model for the Kink Effect on InAlAs/InGaAs HEMTs." *IEEE Trans. Electr. Dev.*
- Song, S., and S.G.J. Mochrie. "Attractive Interactions Between Steps, Tricriticality and Faceting in the Orientational Phase Diagram of Silicon Surfaces Between (113) and (114)." *Phys. Rev. B.*
- Tessmer, S.H., P.I. Glicofridis, R.C. Ashoori, L.S. Levitov, and M.R. Melloch. "Subsurface Charge Accumulation of the Quantum Hall Liquid." *Nature.*
- Tessmer, S.H., R.C. Ashoori, and M.R. Melloch. "Scanning Capacitance Microscopy of the Quantum Hall Effect." *Science.*

**Books and Chapters in Books**

- Boivin, L., C.R. Doerr, K. Bergman, and H.A. Haus. "Quantum Noise Reduction using a Nonlinear Sagnac Loop with Positive Dispersion." In *Quantum Communications and Measurements*. Eds. V.P. Belavkin, O. Hirota, and R.L. Hudson. New York: Plenum Press, 1995.
- Cheng, T.K., M.S. Dresselhaus and E.P. Ippen. "Direct Observation of Ultrafast Ionic Screening." In *Ultrafast Phenomena IX*. Eds. P.F. Barbara et al. Springer-Verlag, 1994.
- Cho, K., and J.D. Joannopoulos. "The Devilish World of Surfaces." In *Toward Teraflop Computing and New Grand Challenge Applications.*, Eds. R.K. Kailia, and P. Vashishta. Commack, New York: Nova Science Publishers, Inc., 1995.
- DiFilippo, F., V. Natarajan, M. Bradley, F. Palmer, and D.E. Pritchard. "Accurate Atomic Mass Measurements from Penning Trap Mass Comparisons of Individual Ions." In *Atomic Physics 14*, New York: American Institute of Physics., 1995.
- Haus, H.A. "Short Pulse Generation." In *Compact Sources of Ultrashort Pulses*. Ed. I. Duling. Cambridge University Press, 1996.
- Haus, H.A., J.N. Damask, and M.J. Khan. "Distributed Feedback Channel Dropping Filters." In *Guided-Wave Optoelectronics.*, pp. 299-311. Eds. T. Tamir et al. New York: Plenum Press, 1995.
- Ho, E., and L.A. Kolodziejski. "Gaseous Source UHV Epitaxy Technologies for Wide Bandgap II-VI Semiconductors." In *Semiconductors and Semimetals*. Eds. R.L. Gunshor and A.V. Nurmikko. Boston: Academic Press, 1997.
- Joannopoulos, J.D., R.D. Meade, and J. Winn. *Photonic Crystals*. Princeton University Press, 1995.

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

Ketterle, W., and N.J. van Druten. "Evaporative Cooling of Trapped Atoms." In *Advances in Atomic, Molecular, and Optical Physics*. 37: 181-236. Eds. B. Bederson and H. Walther. San Diego: Academic Press, 1996..

Kolodziejski, L.A., R. L. Gunshor, and A.V. Nurmikko. "Wide Bandgap II-VI Heterostructures for Blue/Green Optical Sources: Key Materials Issues." In *Annual Review of Materials Science*, 1995.

Pritchard, D.E., M.S. Chapman, C.R. Ekstrom, T.D. Hammond, J. Schmiedmayer, A. Lenef, R. Rubenstein, and S. Wehinger. "Interferometry with Atoms and Molecules." In *Fundamental Problems in Quantum Theory, Annals of the New York Academy of Sciences*. Eds. D.M. Greenberger and A. Zeilinger, (Baltimore, 1994).

Schmiedmayer, J., M.S. Chapman, C.R. Ekstrom, T.D. Hammond, A. Lenef, R.A. Rubenstein, E.T. Smith, and D.E. Pritchard. "Optics and Interferometry with Atoms and Molecules." In *Atom Interferometry, Advances in Atomic and Molecular Physics*. Ed. P.R. Berman (San Diego: Academic Press, 1997).

Smith, H.I. "Microlithography" In *Encyclopedia of Applied Physics*. Ed. G.L. Trigg. Weinheim, Germany: VCH Publishers, 1994.

**Theses and Dissertations**

Abusch-Magder, D. *Artificial atoms and Electron Puddles: Single and Double Barriers in a Silicon MOS System*. Ph.D. diss., Dept. of Physics, MIT, 1997.

Adams, T. *Gate Delay in InP Heterostructure Field-Effect Transistors*. S.B. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.

Aggarwal, R.J. *Design of Resonant-Tunneling Diodes for a GaAs Integrated SRAM*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.

Andreev, A. *Random Matrices, Quantum Chaos and Irreversible Classical Dynamics*. Ph.D. diss., Dept. of Physics, MIT, 1996.

Burkhardt, M. *Fabrication Technology and Measurement of Coupled Quantum Dot Devices*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1995.

Boivin, L. *Squeezing in Optical Fibers*. Ph.D. diss., Dept. of Physics, MIT, 1996.

Capaz, R. *Ab initio Studies of Semiconductors: Defects, Surfaces and Interfaces*. Ph.D. diss., Dept. of Physics, MIT, 1996.

Chapman, M.S. *Photon Induced Coherence Loss in Atom Interferometry*. Ph.D. diss., Dept. of Physics, MIT, 1995.

Chklovskii, D.B. *Transport Properties of the Quantum Hall State*. Ph.D. diss., Dept. of Physics, MIT, 1994.

Cho, K. *New Methods for the Calculation of Dynamical Properties of Many-Particle Systems*. Ph.D. diss., Dept. of Physics, MIT, 1994.

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Damask, J.N. *Integrated-Optic Grating-Based Filters for Optical Communication Systems*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Davis, K.B. *Evaporative Cooling of Sodium Atoms*. Ph.D. diss., Dept. of Physics, MIT, 1995.
- DiFilippo, F. *Precise Atomic Masses for Determining Fundamental Constants*. Ph.D. diss., Dept. of Physics, MIT, 1994.
- Entin, I.A. *Magnetic Trapping of Neutral Sodium Atoms*. S.B. thesis, Dept. of Physics, MIT, 1995.
- Ernst, A. *A Pulse I-V System for Large Signal High-Frequency HFET Characterization*. M.Eng. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1997.
- Ferrera, J. *Highly Coherent Gratings for Optoelectronics: An Application of Spatial-Phase-Locked Electron Beam Lithography*. B.S./M.S. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Greenberg, D.R. *The Physics and Technology of the InAlAs /n<sup>+</sup>-InP Heterostructure Field-Effect Transistor*. Ph.D. diss., Dept. of Electr. Eng. And Comput. Sci., MIT, 1995.
- Hammond, T.D. *Atom Interferometry: Dispersive Index of Refraction and Rotation Induced Phase Shifts for Matter-Waves*. Ph.D. diss. 1997.
- Hector, S.D. *Optimization of Image Formation in X-Ray Lithography Using Rigorous Electromagnetic Theory and Experiments*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Ho, E. *Growth and Doping of ZnSe Using Alternative Gaseous Source Epitaxy Techniques*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Hoshino, I. *Hyperthermal Beam Etching of III-V Heterostructures*. Ph.D. diss., Dept. of Mater. Sci. and Eng., MIT, 1997.
- Hu, H. *Experimental Study of Electron Velocity Overshoot in Silicon Inversion Layers*. Ph.D. diss., Dept. of Physics, MIT, 1994.
- Huang, E.W. *Computer Control of an Experiment to Study Bose-Einstein Condensation*. S.B. thesis, Dept. of Physics, MIT, 1996.
- Jackson, K.M. *Laterally Non-Uniform Doping Profiles in MOSFETs: Modeling and Analysis*. M.S. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Johnson, J.T. *Application of Numerical Models for Rough Surface Scattering*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Kumar, A. *Single Electron Charging Effects in Quantum Dot Nanostructures*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Lenz, G. *Femtosecond Sources at 1.5 microns and Their Application for Time-Resolved Spectroscopic Studies of Semiconductor Devices*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1995.



**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Li, H. *Temperature Homogenization with Tungsten Absorber on X-ray Mask*. S.B. and S.M. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Li, K. *Finite Difference-Time Domain Analysis of Electromagnetic Interference and Radiation Problems*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1995.
- Lutwak, R. *Millimeter-Wave Studies of Hydrogen Rydberg States*. Ph.D. diss., Dept. of Physics, MIT, 1996.
- Martin, P.S. *Quantum Well Intersubband Photodetectors in Focal Plane Arrays*. Ph.D. diss., Dept. of Physics, MIT, 1996.
- Meinhold, M. *Aligned T-gate Fabrication Using X-ray Lithography*. M.S. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Mewes, M.-O. *Bose-Einstein Condensation of Sodium Atoms*. Ph.D. diss., Dept. of Physics, MIT, 1997.
- Mucciolo, E.R. *Universal Correlations in the Quantum Spectra of Chaotic Systems in Exactly Solvable Many-Body Problems*. Ph.D. diss., Dept. of Physics, MIT, 1994.
- Owen, G.M. *Optical and Mechanical Characterization of Thin Membranes for X-Ray Lithography*. M.S. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Pelly, J.D. *Magnetostatic Traps for Sodium Atoms*. S.B. thesis, Dept. of Physics, MIT, 1994.
- Peng, L.-H. *Electron Intersubband Transitions in  $n^+$ InGaAs Quantum Wells: Optical Selection Rules and Strain Effects*. Ph.D. diss., Dept. of Appl. Physics, Harvard Univ., 1994.
- Putnam, C. *Power Limiting Mechanisms in InP HEMTs*. M.Eng. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1997.
- Ramaswamy, M. *Femtosecond Pulse Generation in Solid-State Lasers*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Ramstad, M.J. *Instabilities of Vicinal Silicon (111) Surfaces*. Ph.D. diss., Dept. of Physics, MIT, 1996.
- Reiner, J.W. *A Small-Signal Model for Surface Effects in InAlAs/InGaAs HFETs*. S.B. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.
- Rusinkiewicz, S.M. *Simultaneous Two-Ion Mass Spectroscopy*. S.B. thesis, Dept. of Physics, MIT, 1995.
- Shah, S. *Free-standing 100 nm Period Gratings Produced by Achromatic Holographic Lithography*. M.S. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1995.
- Silevitch, D.M. *Electrostatic Modeling of a Scanning Probe Microscope*. S.B. thesis, Dept. of Physics, MIT, 1996.
- Singer, A.C. *Signal Processing and Communications with Solitons*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Smet, J.H. *Intrawell and Interwell Intersubband Transitions in Single and Multiple Quantum Well Heterostructures*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1994.

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Burkhardt, M., S. Silverman, H.I. Smith, D.A. Antoniadis, K.W. Rhee, and M.C. Peckerar. "Gap Control in the Fabrication of Quantum-Effect Devices Using X-Ray Nanolithography." *Microelectron. Engin.* 27: 307-310 (1995).
- Courtney, M., H. Jiao, N. Spellmeyer, and D. Kleppner. "Quantum Chaos and Rydberg Atoms in Strong Fields." *Proceedings of the Drexel Conference*.
- Davis, K.B., M.-O. Mewes, M.A. Joffe, M.R. Andrews, and W. Ketterle. "Evaporative Cooling of Sodium Atoms." *Book of Abstracts of the Research Conference on Bose-Einstein Condensation*, Mont Ste. Odile, France, June 1995.
- Davis, K.B., M.-O. Mewes, M.R. Andrews, N.J. van Druten, D.S. Durfee, D.M. Kurn, and W. Ketterle. "Bose-Einstein Condensation in a Gas of Sodium Atoms." *Technical Digest of the 1996 European Quantum Electronics Conference*.
- Davis, K.B., M.-O. Mewes, M.A. Joffe, and W. Ketterle. "Evaporative Cooling of Sodium Atoms." *Book of Abstracts of the 14th International Conference on Atomic Physics*, Boulder, Colorado, 1994.
- Davis, K.B., M.-O. Mewes, M.R. Andrews, and W. Ketterle. "Transfer of Laser-cooled Atoms into a Magnetic Trap." *Program of the Optical Society of America Annual Meeting*, Dallas, Texas, 1994.
- DiFilippo, F., V. Natarajan, M. Bradley, F. Palmer, and D.E. Pritchard. "Accurate Atomic Mass Measurements from Penning Trap Mass Comparisons of Individual Ions." *Proceedings of the Fourteenth International Conference on Atomic Physics*. Boulder, Colorado, 1994.
- Ding, K.H., Y.E. Yang, S.E. Shih, J.A. Kong, and R.E. Davis. "Modeling of Electromagnetic Wave Scattering from Time-Varying Snowcover." *Proceedings of the IEEE Geoscience and Remote Sensing Society Meeting*, Lincoln, Nebraska, May 27-31, 1996.
- Durfee, D.S., M.-O. Mewes, M.R. Andrews, N.J. van Druten, D.M. Kurn, C.G. Townsend, and W. Ketterle. "Imaging of a Bose-Einstein Condensate." *Book of Abstracts. Optical Society of America Annual Meeting*, 1996.
- Fonstad, Jr., C.G., J.F. Ahadian, S.G. Patterson, P.T. Vaidyanathan, Y. Royter, G.S. Petrich, L.A. Kolodziejski, and S. Prasad. "Epitaxy-on-Electronics Enhancement of GaAs IC Performance with Monolithic Optical and Quantum-Effect Devices." *Proceedings of the 1997 Advanced Workshop on Frontiers in Electronics (WOFE'97)*, Tenerife, Spain, January 6-11, 1997.
- Fonstad, Jr., C.G., J.F. Ahadian, S.G. Patterson, P.T. Vaidyanathan, Y. Royter, G.S. Petrich, L.A. Kolodziejski, W.D. Goodhue, and S. Prasad. "Growing Optoelectronics on GaAs Integrated Circuits." *Proceedings of the 24<sup>th</sup> Annual Symposium and Exhibition of the International Microelectronic and Packaging Society (IMAPS)*, Andover, Massachusetts, May 8, 1997.
- Golubovic, B., B. Bouma, I.P. Bilinsky, J.G. Fujimoto, and V.P. Mikhailov, "Room-temperature cw Cr<sup>4+</sup>:forsterite laser using an ultrathin crystal pumped in the near-infrared," *Technical Digest of the Conference on Lasers and Electro-Optics, CLEO'96*, Anaheim, California, June 2-7, 1996.
- Gould, P.L., and D.E. Pritchard. "Atoms Interacting with Standing Light Waves: Diffraction, Diffusion, and Rectification." *Proceedings of the Enrico Fermi Summer School on Coherent and Collective Interactions of Particles and Radiation Beams*, Varenna, Italy, July 11-12, 1996.

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Hall, K.L., J.D. Moores, K.A. Rauschenback, W.S. Wong, E.P. Ippen, and H.A. Haus. "All-Optical Storage of a 1.25 kb Packet at 10 Gb/s" *Conference on Lasers and Electro-Optics, OSA Technical Digest Series*. Washington, DC, 1995.
- Hector, S.D., H.I. Smith, N. Gupta, and M.L. Schattenburg. "Optimizing Synchrotron-Based X-ray Lithography for 0.1  $\mu\text{m}$  Lithography." *Microelectron. Engin.* 23: 203-206 (1994).
- Joannopoulos, J.D. "Ab initio Statistical Mechanics." *Proceedings of QTRM Conference*, Berkeley, California, 1994.
- Kastner, M.A. "Mesoscopic Physics with Artificial Atoms." *Proceedings of the 23<sup>rd</sup> International Conference on the Physics of Semiconductors*, 1: 27 (1996).
- Ketterle, W. "Bose-Einstein Condensates: A New Form of Quantum Matter." *Book of Abstracts*. Optical Society of America Annual Meeting, 1996.
- Ketterle, W. "Cooling and Trapping of Neutral Atoms." *Book of Abstracts: The Future of Spectroscopy: From Astronomy to Biology*. National Research Council of Canada, Quebec, Canada, September 1994.
- Ketterle, W. "Gravitational Limitations of Experiments with Magnetically Trapped Nanokelvin Atoms." *Proceedings of the 1996 NASA/JPL Low Temperature Microgravity Physics Workshop*, Pasadena, California, 1996.
- Ketterle, W. "Observation of Bose-Einstein Condensation in a Gas of Sodium Atoms." *Book of Abstracts of the Workshop on Collective Effects in Ultracold Atomic Gases*, Les Houches, France, April 1-5, 1996.
- Ketterle, W. "Observation of Bose-Einstein Condensation in Ultracold Atomic Gases." *Proceedings of the 15th General Conference of the Condensed Matter Division of the European Physical Society*, Baveno-Stresa, Italy, April 22-25, 1996; *Europhysics Conference Abstracts* 20A: 3 (1996).
- Ketterle, W., K.B. Davis, M.A. Joffe, M.-O. Mewes, and D.E. Pritchard. "Dark Cold Atoms at High Densities." *Technical Digest Series of the International Quantum Electronics Conference*, Anaheim, California, 1994.
- Ketterle, W., M.R. Andrews, D.S. Durfee, D.M. Kurn, M.-O. Mewes, C.G. Townsend, and N.J. van Druten. "Bose-Einstein Condensation of Sodium Atoms." *Conference Handbook of the XXIth International Conference on Low Temperature Physics*, Prague, Czech Republic, 1996.
- Ketterle, W., M.R. Andrews, K.B. Davis, D.S. Durfee, D.M. Kurn, M.-O. Mewes, and N.J. van Druten. "Bose-Einstein Condensation of Ultracold Atomic Gases." *Phys. Scr.* T66: 31-37 (1996).
- Klein, O., C. de C. Chamon, D. Goldhaber-Gordon, M.A. Kastner and X.-G. Wen. "Phase Transitions in Artificial Atoms." *Proceedings of the NATO Advanced Study Institute on Quantum Transport in Semiconductor Submicron Structures*, 1996.
- Klein, O., C. de C. Chamon, D. Tang, D.M. Abusch-Magder, U. Meirav, X.-G. Wen, and M.A. Kastner. "Study of a Coulomb Island in Strong Magnetic Fields." *Proceedings of the 11<sup>th</sup> International Conference on High Magnetic Fields in Semiconductors*. Singapore: World Scientific, 1996.

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Kurn, D.M., D.S. Durfee, M.-O. Mewes, M.R. Andrews, N.J. van Druten, and W. Ketterle. "A New Magnetic Trap Design for the Study of Bose-Einstein Condensates." *Bull. Am. Phys. Soc.* 41: 1131 (1996).
- Lutwak, R., J. Holley, J. DeVries, and D. Kleppner. "Millimeter-Wave Measurement of the Rydberg Frequency." *Proceedings of the Fifth Symposium on Frequency Standards and Metrology*, Woods Hole, Massachusetts, October 15-19, 1995.
- Mewes, M.-O., M.R. Andrews, N.J. van Druten, D.M. Kurn, D.S. Durfee, C.G. Townsend, and W. Ketterle. "Properties of a Weakly Interacting Bose-Einstein Condensate." *Book of Abstracts of the U.S. Workshop on Bose-Einstein Condensation*, Boulder, Colorado, July 1996.
- Mewes, M.-O., K.B. Davis, P. Yesley, M.A. Joffe, D.E. Pritchard, and W. Ketterle. "A Spin-flip Zeeman Slower for the Production of Intense Slow Sodium Beams." *Program of the Optical Society of America Annual Meeting*, Dallas, Texas, 1994.
- Pritchard, D.E. "Atom Interferometer." *Proceedings of the 13th Intern. Conf. on Atomic Physics*, eds. T.W. Hansch, H. Walther, and B. Neizert. New York: American Inst. Of Physics, 1994.
- Pritchard, D.E., M.S. Chapman, T.D. Hammond, A. Lenef, R.A. Rubenstein, E.T. Smith, and J. Schmiedmayer. "Atom Interferometers and Atomic Coherence." *Proceedings of the Conference on Quantum Interferometry II*. Trieste, Italy, March 4-8, 1996.
- Pritchard, D.E., M.S. Chapman, T.D. Hammond, A. Lenef, R.A. Rubenstein, J. Schmiedmayer, and E.T. Smith. "Photon Scattering from Atoms in an Atom Interferometer: Coherence Lost and Regained." *Proceedings of the Seventh Rochester Conference on Coherence and Quantum Optics*. Rochester, New York, June 7-9, 1995.
- Pritchard, D.E., M.S. Chapman, T.D. Hammond, D.A. Kokorowski, A. Lenef, R.A. Rubenstein, E.T. Smith and J. Schmiedmayer. "Quantum Decoherence and Inertial Sensing with Atom Interferometers." *Proceedings of the Fifteenth International Conference on Atomic Physics*. Amsterdam, The Netherlands, August 5-9, 1996.
- Pritchard, D.E., T.D. Hammond, A. Lenef, J. Schmiedmayer, R.A. Rubenstein, E.T. Smith, and M.S. Chapman. "Using an Atom Interferometer to Take the Gedanken out of Feynman's Gedanken Experiment." *Proceedings of the Conference on Resonance Ionization Spectroscopy*. State College, Pennsylvania, 1996.
- Shih, S.E., K.H. Ding, S.V. Nghiem, C.C. Hsu, J.A. Kong, and A.K. Jordan. "Thickness Retrieval using Time Series Electromagnetic Measurements of Laboratory Grown Saline Ice." *Proceedings of the IEEE Geoscience and Remote Sensing Society Meeting*, Lincoln, Nebraska, May 27-31, 1996.
- Singer, A.C. "Signaling Techniques using Solitons." *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'95)*, Detroit, Michigan, May 8-12, 1995.
- Singer, A.C. "Signal Processing Techniques for Efficient Use of Transmit Diversity in Wireless Communication." *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'96)*, Atlanta, Georgia, May 7-10, 1996.
- Singer, A.C. "Detection and Estimation of Soliton Signals." *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP'96)*, Atlanta, Georgia, May 7-10, 1996.

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

- Smith, H.I., and M.L. Schattenburg. "X-ray Nanolithography: Limits and Application to Sub-100 nm Manufacturing." NATO Workshop on Nanolithography, Rome, Italy April 6-8, 1993. In *Nanolithography: A Borderland between STM, EB, IB, and X-Ray Lithographies*. Eds. M. Gentili et al. Netherlands: Kluwer Academic Publishers, 1994.
- Somerville, M.H., J.A. del Alamo, and P. Saunier. "Off-State Breakdown in Power HEMTs: the Impact of the Source." *Proceedings of the 1996 Device Research Conference*.
- Somerville, M.H., J.A. del Alamo, and W. Hoke. "A New Physical Model for the Kink Effect on InAlAs/InGaAs HEMTs." *Proceedings of the International Electron Devices Meeting*, Washington, DC, December, 1995.
- Townsend, C.G., N.J. van Druten, M.R. Andrews, D.S. Durfee, D.M. Kurn, M.-O. Mewes, and W. Ketterle. "Bose-Einstein Condensation of a Weakly Interacting Gas." *Proceedings of the Fifteenth International Conference on Atomic Physics*, Amsterdam, The Netherlands, 1996.
- Townsend, C.G., N.J. van Druten, M.R. Andrews, D.S. Durfee, D.M. Kurn, M.-O. Mewes, and W. Ketterle. "Ultracold Atoms and Bose-Einstein Condensation." In *OSA Trends in Optics and Photonics*, vol. 7. Ed. K. Barnett. Washington, DC: Optical Society of America, 1996.
- van Druten, N.J., C.G. Townsend, M.R. Andrews, D.S. Durfee, D.M. Kurn, M.-O. Mewes, and W. Ketterle. "Bose-Einstein Condensates-A New Form of Quantum Matter." *Czech. J. Phys.* 46: 3077-3088 (1996).
- van Druten, N.J., D.S. Durfee, K.B. Davis, M.-O. Mewes, M.R. Andrews, D.M. Kurn, and W. Ketterle. "Bose-Einstein Condensation of Sodium Atoms." *Technical Digest of the XX International Quantum Electronics Conference*, 1996.
- van Druten, N.J., M.-O. Mewes, M.R. Andrews, D.M. Kurn, D.S. Durfee, C.G. Townsend, and W. Ketterle. "Bose-Einstein Condensation in a Gas of Sodium Atoms." *Book of Abstracts of the 15th International Conference on Atomic Physics*, Amsterdam, The Netherlands, 1996.
- Vieri, C., I.Y. Yang, C. Chandrakasan, and D.A. Antoniadis. "SOIAS: Dynamically Variable Threshold SOI with Active Substrate." *Digest of Technical Papers*, Symposium on Low Power Electronics, 1995.
- Yang, I.Y., C. Vieri, A. Chandrakasan, and D.A. Antoniadis. "Back Gated CMOS on SOIAS for Dynamic Threshold Voltage Control." *IEDM Tech. Digest*, 1995.
- Zhitenev, N.B., M. Brodsky, R.C. Ashoori, and M.R. Melloch. "Tunneling Resonances at the Edge of the Two-Dimensional Electron Gas: Evidence for Long Range Structure." *Proceedings of the 23rd International Conference on the Physics of Semiconductors*, 1996.

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

- Sokolinski, I. *A Study of the Two Dimensional Electron Gas by Time Domain Capacitance Spectroscopy*. S.B. thesis, Dept. of Physics, MIT, 1995.
- Song, S. *Faceting and Tricriticality in the Orientational Phase Diagram of Stepped Si(113) Surfaces: Synchrotron X-ray Scattering Studies*. Ph.D. diss., Dept. of Physics, MIT, 1996.
- Sun, C.-K. *Femtosecond Nonlinearities in InGaAs Strained-layer Single-quantum-well Diode Lasers*. Ph.D. diss., Harvard Univ., 1994.
- Tannian, B.E. *Near Field Imaging of Atom Diffraction Gratings: the Atomic Talbot Effect*. S.B. thesis, Dept. of Physics, MIT, 1994.
- Thompson, Jr., S.H. *Radio Frequency Induced Evaporative Cooling of Magnetically Trapped Neutral Sodium Atoms*. S.B. thesis, Dept. of Physics, MIT, 1995.
- Tomsio, N. *Modeling Electrically Small Apertures Using the Finite Difference-Time Domain Method*. S.M. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1997.
- Ulman, M. *Femtosecond Carrier Dynamics in AlGaAs*. Ph.D. diss., Dept. of Physics, MIT, 1994.
- Wan Morshidi, W.Y. *Frequency Modulation Spectroscopy for Frequency Stabilization of Dye-laser*. S.B. thesis, Dept. of Physics, MIT, 1994.
- Warlick, E.L. *The Effect of Nucleation on the Quality of MBE ZnSe/III-V Heterostructures*. M.Eng. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Wong, V.V. *Fabrication of Distributed Feedback Devices Using X-ray Lithography*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1995.
- Yan, J.K. *The Monte Carlo Technique with Pulse Compression for Rough Surface Scattering*. S.M. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Yang, I. *Study of Sub-0.5 mm SOI-with-Active Substrate (SOLAS) Technology for Ultra-Low Power Applications*. Ph.D. diss., Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Yasaka, A. *Feasibility Study of Spatial-Phase-Locked Focused-Ion-Beam Lithography*. M.S. thesis, Dept. of Mat. Sci. and Eng., MIT, 1995.
- Yeang, C.-P. *Analysis of Intermodulation Interference to the Instrument Landing System*. S.M. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Yee, K.W. *Gold-Electroplating Technology for X-Ray-Mask Fabrication*. M.S. thesis, Dept. of Electr. Eng. and Comput. Sci., MIT, 1996.
- Yesley, P.S. *The Design and Testing of Novel, Spin-Flip, Zeeman Slowing Technique*. S.B. thesis, Dept. of Physics, MIT, 1995.
- Young, M.J. *Equilibrium and Non-Equilibrium Phenomena in Two- and Three-Dimensional Correlated Systems*. Ph.D. diss., Dept. of Physics, MIT, 1996.

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

**Technical Report**

Singer, A.C. *Signal Processing and Communication with Solitons*. RLE TR-611. MIT, 1996.

**Meeting Papers Presented**

*Adhesion Society*, 19<sup>th</sup> Annual Meeting, Myrtle Beach, South Carolina, February 17-21, 1996.

Ding, K.H., S.E. Shih, and J.A. Kong. "Calculation of Effective Dielectric Constants and Attenuation Rates for Densely Packed Systems with Multicomponent Adhesive Spheres."

*American Physical Society*, San Jose, California, March 20-24, 1995.

Burkhardt, M., D.J. Carter, D.A. Antoniadis, T.P. Orlando, Henry I. Smith and M.R. Melloch.  
"Coulomb Blockade Effects in Double Quantum Dots."

Capaz, R.B., H. Lim, and J.D. Joannopoulos. "Ab Initio Studies of the Initial Stages of GaN Growth on SiC."

*American Physical Society*, St. Louis, Missouri, March 17-22, 1996.

Capaz, R.B., K. Cho, and J.D. Joannopoulos. "Ab Initio Studies of Adatom Vacancies on the Si(111)-(7x7) Surface."

*Annual Meeting of the Division of Atomic, Molecular, and Optical Physics*, Toronto, Ontario, Canada, May 16-19, 1995.

Ketterle, W. "Evaporative Cooling of Magnetically Trapped Sodium."

Pritchard, D.E., M.S. Chapman, C.R. Ekstrom, T.D. Hammond, J. Schmiedmayer, A. Lenef, R. Rubenstein, and S. Wehinger. "Interferometry with Atoms and Molecules."

*CAP Canadian Association of Physicists*, 51<sup>st</sup> Annual Congress, Ottawa, Canada, June 17-19, 1996.

Ketterle, W. "Bose-Einstein Condensation."

*Colloquium on Quantum Electronics, 25th Winter*, Snowbird, Utah, January 3-5, 1995.

Pritchard, D.E. "Atom Optics and Atom Interferometers."

*Conference on Coherence and Quantum Optics, Seventh*, Rochester, New York, June 7-10, 1995.

Pritchard, D.E. "Atom Interferometers and Atomic Coherence."

*Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science (CLEO/QELS)*, Annual, San Francisco, California, November 1, 1995.

Little, B.E., S.T. Chu, and H.A. Haus. "Micro-Ring Resonator Channel Dropping Filters."

*Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science (CLEO/QELS)*, Baltimore, Maryland, May 21-26, 1995.

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

- Bouma, B., and J.G. Fujimoto. "Compact Gigahertz Repetition Rate Kerrs-Lens Mode Locked  $\text{Ti:Al}_2\text{O}_3$  Lasers Using Positive Dispersion."
- Darwish, A.M., G. Lenz, E. Ippen, C.Q. Le, J.P. Donnelly, S. Groves, and E. Swanson. "Frequency Conversion in Passive InGaAsP/InP Waveguides."
- Haus, H.A. "Squeezing in a Sagnac Effect Loop."
- Haus, H.A., E.P. Ippen, W.S. Wong, F.I. Khatri, and K.R. Tamura. "Pulse Self-Ordering in Soliton Fiber Lasers."
- Lenef, A., M.S. Chapman, T.D. Hammond, J. Schmiedmayer, R. Rubenstein, E.T. Smith, and D.E. Pritchard. "Photon Scattering in an Atom Interferometer: Coherence Loss and Recovery."
- Lenz, G., E.T. Gellerman, E.P. Ippen, and K. Tamura. "Stretched-Pulse Mode-Locked Erbium-Fiber Laser Amplified by KCl:Ti Color-Center Crystals."
- Lenz, G., E.P. Ippen, J.M. Wiesenfeld, M.A. Newkirk, V. Koreu, and R.M. Jopson. "Anisotropy in the Ultrafast Nonlinear Response of Semiconductor Optical Amplifiers with Polarization-Intensive Gain."
- Nelson, L., K. Tamura, E.P. Ippen, and H.A. Haus. "Additive Pulse Mode-Locked Thulium-Doped Fiber Ring Laser."

*Conference on Lasers and Electro-Optics/Quantum Electronics and Laser Science (CLEO/QELS)*, San Francisco, California, May 27-June 16, 1996.

- Bolubovic, B., B. Bouma, I.P. Bilinsky, and J.G. Fujimoto. "Room Temperature  $\text{Cr}^{4+}$ :Forsterite Laser Using an Ultra Thin Crystal Pumped in the Near Infrared."
- Haus, H.A., and E.P. Ippen. "Short-pulse Fiber Lasers."
- Lenz, G., S.B. Fleischer, L.E. Nelson, D.J. Dougherty, and E.P. Ippen. "91pJ 73fs Pulses from a Frequency-Doubled Stretched-Pulse Additive-Pulse Modelocked Fiber Laser."
- van Druten, N.J., D.S. Durfee, K.B. Davis, M-O. Mewes, M.R. Andrews, D.M. Kurn, and W. Ketterle. "Bose-Einstein Condensation of Sodium Atoms."

*Conference on Lasers and Electro Optics (CLEO'97)*, Baltimore, Maryland, May 18-23, 1997.

- Chernikov, S.V., J.R. Taylor, V.P. Gapontsev, B.E. Bouma, and J.G. Fujimoto, "A 75-nm, 30-mW superfluorescent ytterbium fiber source operating around 10.6  $\mu\text{m}$ ."

*Conference on the Dynamics of Crystal Surfaces and Interfaces*, Traverse City, Michigan, August 1996.

- Mochrie, S.G.J. "Faceting of Stepped Si(113): Step Unbinding, Dynamic Scaling, and Self-Assembly of Nano-scale Grooves."

*Conference on Ultrafast Transmission Systems in Optical Fibres*, Trieste, Italy, February 1995.

- Haus, H.A., F.I. Khatri, and W.S. Wong. "Soliton Interaction with Continuum."

*Division of Atomic, Molecular, and Optical Physics Annual Meeting*, Detroit, Michigan, May 14-18, 1996.

- Holley, J., R. Lutwak, J. Devries, and D. Kleppner. "Millimeter-Wave Measurement of the Rydberg Frequency."
- Ketterle, W. "Bose-Einstein Condensation in a Gas of Sodium Atoms."
- Kurn, D.M., D.S. Durfee, M-O. Mewes, M.R. Andrews, N.J. van Druten, and W. Ketterle. "A New Magnetic Trap Design for the Study of Bose-Einstein Condensates."



**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

*European Quantum Electronics Conference*, Hamburg, Germany, September 8-13, 1996.

Davis, K.B., M-O. Mewes, M.R. Andrews, N.J. van Druten, D.S. Durfee, D.M. Kurn, and W. Ketterle. "Bose-Einstein Condensation in a Gas of Sodium Atoms."

*European Research Conferences on Bose-Einstein Condensation*, Mont Ste. Odile, France, June 16-21, 1995.

Davis, K.B., M-O. Mewes, M.A. Joffe, M.R. Andrews, and W. Ketterle. "Evaporative Cooling of Sodium Atoms."

*Gordon Research Conference on Atomic Physics*, Wolfboro, New Hampshire, July 2-7, 1995

Davis, K.B., M-O. Mewes, M.R. Andrews, and W. Ketterle. "Recent Progress in Evaporative Cooling of Sodium in Modified Magnetic Trap." (poster session)

Ketterle, W. "Evaporative Cooling of Sodium Atoms."

Lenef, A., T.D. Hammond, M.S. Chapman, E. Smith, R.A. Rubenstein, J. Schmiedmayer, and D.E. Pritchard. "Applications of Atom Interferometry: Inertial Measurements, Molecules, and Index of Refraction of Gases."

Pritchard, D.E. "Atom Interferometers."

*Gordon Research Conference on Correlated Electron Systems*, Plymouth, New Hampshire, July 21-26, 1996.

Abusch-Magder, D., and M. Kastner. "Tunnel Barrier in a Silicon MOS Device: Artificial Atoms, Electron-Electron Interactions, and Correlation Effects."

*Gordon Research Conference on Lasers and Nonlinear Optics*, Tilton, New Hampshire, July 30-August 4, 1995.

Boivin, L., and H.A. Haus. "Quantum Cross-Phase Modulation."

Bouma, B., and J.G. Fujimoto. "Compact Kerr Lens Modelocked Lasers." (poster session)

Haus, H.A., W.S. Wong, and F.I. Khatri. "Continuum Generation by Perturbation of Soliton."

Jones, D.J., H.A. Haus, E.P. Ippen, and C.R. Doerr. "Theory and Characterization of Asynchronous Modelocking."

Lenz, G. "Femtosecond Studies of the Anisotropic in the Nonlinear Response of Semiconductor Optical Amplifiers with Isotropic Linear Gain."

*High Throughput X-ray Spectroscopy Workshop*, Cambridge, Massachusetts, September 30-October 1, 1996.

Franke, A., and M.L. Schattenburg, "Super-smooth X-ray Reflection Grating Technology."

*IEEE Lasers and Electro-Optics Society Annual Meeting (LEOS 96)*, Ninth, Boston, Massachusetts, November 18-21, 1996

Haus, H.A., and E.P. Ippen. "Short-pulse Fiber Lasers."

*International Conference on Atomic Physics Zeeman-Effect Centenary*, 15<sup>th</sup>, Amsterdam, The Netherlands, August 5-9, 1996.

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

van Druten, N.J., M-O. Mewes, M.R. Andrews, D.M. Kurn, D.S. Durfee, C.G. Townsend, and W. Ketterle. "Bose-Einstein Condensation in a Gas of Sodium Atoms."

*International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication*, Phoenix, Arizona, May 30-June 2, 1995.

Ferrera, J., M.L. Schattenburg, and H.I. Smith. "Analysis of Distortion in Interferometric Lithography."

Moon, E.E., P.N. Everett, and H.I. Smith. "Simultaneous Measurement of Gap and Superposition in a Precision Aligner for X-ray Nanolithography."

Savas, T.A., M.L. Schattenburg, J.M. Carter, and H.I. Smith. "Large-Area Achromatic Interferometric Lithography for 100 nm-Period Gratings and Grids With Novel Applications."

Savas, T.A., S.N. Shah, M.L. Schattenburg, J.M. Carter, and H.I. Smith. "Achromatic Interferometric Lithography for 100-nm-period Gratings and Grids."

Smith, H.I. "Maskless X-ray Projection Pattern Generator."

Yang, I.Y., D.A. Antoniadis, and H.I. Smith. "Fabrication of Back-gated CMOS Devices Using Mixed and Matched Optical and X-ray Lithographies."

*International Conference on Electron, Ion, and Photon Beam Technology and Nanofabrication*, Atlanta, Georgia, May 28-31, 1996..

Smith, H.I. "A Maskless X-Ray Projection Pattern Generator."

*International Conference on Low Temperature Physics*, 21<sup>st</sup>, Prague, Czech Republic, August 8-14, 1996.

Ketterle, W., M.R. Andrews, D.S. Durfee, D.M. Kurn, C.G. Townsend, and N.J. van Druten. "Bose-Einstein Condensation of Sodium Atoms."

*International Conference on Molecular Beam Epitaxy, Ninth*, Malibu, California, August 5-9, 1996.

Warlick, E.L., E. Ho, G.S. Petrich, and L.A. Kolodziejski. "Reducing the Defect Density in MBE-ZnSe/III-V Heterostructures."

*International Conference on Superlattices Microstructures and Microdevices*, Eighth, Cincinnati, Ohio, August 20-25, 1995.

Sanders, G.D., C.J. Stanton, C.-K. Sun, B. Golubovic, and J.G. Fujimoto. "Theory of Carriers Gain Dynamics in InGaAs/GaAs Strained-layer Single-quantum-well Lasers."

*International Conference on the Formation of Semiconductor Interfaces, Fifth* Princeton, New Jersey, June 26-30, 1995.

House, J.L., D.J. Dougherty, G.S. Petrich, L.A. Kolodziejski, E.P. Ippen, and G.C. Hua. "Growth and Characterization of ZnSe/GaAs Single Quantum Wells."

*International Conference on GaAs MANufacturing TECHnology (MANTECH)*, San Francisco, California, June 2-5, 1997.

Ahadian, J.F., S.G. Patterson, P.T. Vaidyanathan, Y. Royter, D. Mull, G.S. Petrich, W.D. Goodhue, S. Prasad, L.A. Kolodziejski, and C.G. Fonstad. "Epitaxy-on-Electronics" Building Monolithic OEICs on Commercial GaAs VLSI."

**Publications Acknowledging JSEP Support**

**Contract DAAH04-95-1-0038**

**November 1, 1994 October 31, 1997**

*International Conference on II-VI Compounds and Devices, Seventh, Edinburgh, Scotland, August 15-19, 1995.*

Ho, E., J.L. House, G.S. Petrich, and L.A. Kolodziejski. "Comparison of Hydrogen Passivation of ZnSe:N using Conventional and Gas Source Molecular Beam Epitaxy."

*International Electron Devices Meeting, Washington DC, 1995.*

Somerville, M.H., J.A. del Alamo, and W. Hoke. "A New Physical Model for the Kink Effect on InAlAs/InGaAs HEMTs."

*International Electron Devices Meeting, 1996.*

Somerville, M.H., and J.A. del Alamo. "A Model for Tunneling-Limited Breakdown in High-Power HEMTs."

*International HCIS Conference, Chicago, Illinois, August 1995.*

Sanders, G.D., C.-K. Sun, B. Golubovic, J.G. Fujimoto, and C.J. Stanton. "Hot Carrier Effects in Femtosecond Gain Dynamics of InGaAs/AlGaAs Quantum Well Lasers."

*International Quantum Electronics Conference, 20<sup>th</sup> Sydney, Australia, July 14-19, 1996.*

Davis, K.B., M.-O. Mewes, M.R. Andrews, N.J. van Druten, D.S. Durfee, D.M. Kurn, and W. Ketterle. "Bose-Einstein Condensation in a Gas of Sodium Atoms."

*International Symposium on Future Information Processing Technologies, Porvoo, Finland, September 4-8, 1995.*

Smith, H.I. "Lithographic Approaches and Their Limitations."

*International Workshop on Nonstoichiometry of Interfaces of Semiconductor Heterostructures: Interfacial Chemistry and Property Relations, Suhl, Germany, August 21-26, 1995.*

Kolodziejski, L.A.. "II-VI/III-V Heterovalent Semiconductor Interfaces."

*International Workshop on X-ray and Extreme Ultraviolet Lithography, Osaka, Japan, July 23-26, 1995.*

Yang, I.Y., V.V. Wong, J.N. Damask, J. Ferrera, M. Burkhardt, S. Silverman, D.A. Antoniadis, and H.I. Smith. "Sub-100nm Electronic, Optoelectronic, and Quantum-effect Device Fabrication."

*ISRBG Parameters from SAR Data for Land Applications, Toulouse, France, October 10-13, 1995.*

Hsu, C.C., L. Wang, J.A. Kong, J.C. Souyris, T. Le Toan. "Theoretical Modeling for Microwave Remote Sensing of Forest."

Le Toan, T., F. Ribbes, N. Floury, L. Wang, K.H. Ding, C.C. Hsu, and J.A. Kong. "On the Retrieval of Rice Crop Parameters from SAR Data."

Souyris, J.C., T. Le Toan, C.C. Hsu, and J.A. Kong. "Inversion of Forest Biomass Using SIR-C/X-SAR Data."

van Zyl, J., C. Dobson, J. Dozier, P. Dubois, D. Evans, J.A. Kong, T. LeToan, J. Melack, E. Rignot, S. Saatchi, J.C. Shi, and F.T. Ulaby. "Preliminary Science Results from the SIR-C/X-SAR Mission."

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

Wang, L., C.C. Hsu, J.A. Kong, J.C. Souyris, and T. Le Toan. "Inversion of Forest Biomass Using Neutral Networks."

*Materials Research Society, Fall Meeting, Boston, Massachusetts, December 2-6, 1996.*

Dougherty, D.J., S.B. Fleischer, J.L. House, E.L. Warlick, E. Ho, G.S. Petrich, L.A. Kolodziejski, and E.P. Ippen. "Investigation of Electric Fields, Surface Charges, and Conduction Band Offsets in ZnSe/GaAs Heterojunctions by a Novel Photoreflectance Technique."  
Mochrie, S.G.J. "Faceting of Stepped Si(113): Step Unbinding, Dynamic Scaling, and Self-Assembly of Nano-scale Grooves."

*Materials Research Society, Spring Meeting, San Francisco, California, April 1, 1997.*

Fonstad, C.G., J.F. Ahadian, S.G. Patterson, P.T. Vaidyanathan, Y. Royter, G.S. Petrich, L.A. Kolodziejski, W.D. Goodhue, and S. Prasad. "Epitaxy-on-Electronics: Monolithic Integration of Heterostructure Devices on Commercially Processed Gallium Arsenide Integrated Circuits."

*National Center for Integrated Photonics Technologies Workshop, Santa Monica, California, February 2-3, 1995.*

Darwish, A.M., Lenz, G., Ippen, E.P. "Frequency Conversion in Passive InGaAsP/InP Waveguides."  
Haus, H.A. "Channel Dropping Filters and Progress in their Fabrication."

*National Center for Integrated Photonics Technologies Workshop, Los Angeles, California, February 21-March 2, 1996.*

Damask, J.N., H.A. Haus, L.A. Kolodziejski, J. Ferrera, M.H. Kim, T.E. Murphy, and H.I. Smith. "Narrow-Band Optical Fibers and Circuits."  
Haus, H.A. "Optical Filter Design and Fabrication."  
Ippen, E.P. "Ultrafast All-optical Nonlinearities in Active and Passive Semiconductor Waveguides."  
Nelson, L.E., G. Lenz, S.B. Fleischer, H.A. Haus, and E.P. Ippen. "High-power, Broad-band, and Frequency-doubled Stretched-Pulse Fiber Laser."

*Novosibirsk Conference, September, 1995.*

Schmiedmayer, J., M.S. Chapman, T.D. Hammond, A. Lenef, R.A. Rubenstein, E. Smith, and D.E. Pritchard. "Photon Scattering and Atomic Interference."

*Optical Fiber Communications Conference, San Diego, California, February 26-March 3, 1995.*

Damask, J.N., V.V. Wong, J. Ferrera, H.I. Smith, and H.A. Haus. "Highly-Coherent Electron-Beam-Written Quarter-Wave-Shifted Distributed Bragg Resonators for Channel-Dropping Filters."

*Optical Fiber Communications Conference, San Jose, California, February 25-March 3, 1996.*

Khatri, F.I., S.G. Evangelides, P.V. Mamyshev, B.M. Nyman, and H.A. Haus. "A Line-Monitoring System for Soliton Communication Systems with Sliding-Frequency Guiding Filters."

*Optical Society of America, Annual Meeting, Portland, Oregon, September 9-13, 1995.*

Ippen, E.P. "Ultrafast Science and Technology: How Fast? Which Way?"

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*Optical Society of America, Annual Meeting, Rochester, New York, October 20-24, 1996.*

Durfee, D.S., M-O. Mewes, M.R. Andrews, N.J. van Druten, D.M. Kurn, C.G. Townsend, and W. Ketterle. "Imaging of a Bose-Einstein Condensate."

Ketterle, W. "Bose-Einstein Condensates: A New Form of Quantum Matter."

*Optics and Interfering with Atoms Workshop, Elba, Italy, June 8-13, 1996.*

Rubenstein, R.A., Chapman, T. Hammond, E. Smith, D. Korokowski, A. Lenet, and D. Pritchard. "New Developments in Atom Interferometers."

*Progress in Electromagnetics Research Symposium (PIERS), Seattle, Washington, July 24-28, 1995.*

Ding, K.H., S.E. Shih, Y.E. Yang, and J.A. Kong. "Scattering and Absorption of Electromagnetic Radiation by Bicontinuous Random Media."

Gung, T.J., Y.E. Yang, C.C. Hsu, J.A. Kong, C. Kohler, T. Nguyen, and H. Nguyen. "MMW Radar Range Profile Simulation of Isolated Trees with Radiative Transfer Theory."

Hsu, C.C., J.A. Kong, J.C. Souyris, and T. LeToan. "Application of Radiative Transfer Modeling to the Polarimetric Backscattering of Forest."

Johnson, J.T., J.A. Kong, R.T. Shin, and L. Tsang. "Monte Carlo Studies of Ocean Surface Scattering and Thermal Emission."

Li, K., J.T. Johnson, J.J. Akerson, R.T. Shin, and J.A. Kong. "Theoretical and Numerical Analysis of Berenger's PML."

Manolatu, C., J.T. Johnson, J.A. Kong, and R.T. Shin. "Mixing Laws for Helix Loaded Composite Media B."

Nghiem, S.V., R. Kwok, S.H. Yueh, J.A. Kong, C.C. Hsu, and K.H. Ding. "Variations in Polarimetric Backscattering of Saline Ice Grown Under Diurnal Thermal Cycling Condition."

Shih, S.E., E. Yang, K.H. Ding, J.A. Kong, R.E. Davis, and K. O'Neill. "Discrete Scatter Modeling of Electromagnetic Scattering from Snow."

Shih, S.E., K.H. Ding, A.K. Jordan, C.C. Hsu, R.T. Shin, and J.A. Kong. "Electromagnetic Scattering Inversion Using Bistatic Data."

Shih, S.E., K.H. Ding, S.V. Nghiem, C.C. Hsu, R.T. Shin, J.A. Kong, and A.K. Jordan. "Polarimetric Backscattering Signature of Laboratory Grown Saline Ice."

Souyris, J.C., T. Le Toan, Y. Zhang, C.C. Hsu, and J.A. Kong. "Inversion of Biomass with Polarimetric Data from SIR-C/X-SAR."

Tankuranun, P., K.H. Ding, C.F. Lee, R.T. Shin, and J.A. Kong. "Monte Carlo Simulation of Electromagnetic Wave Scattering by Randomly Buried Particles."

Wang, L., J.T. Johnson, C.C. Hsu, J.A. Kong, J.C. Souyris, and T. Le Toan. "Application of Neural Networks to the Inversion of Geophysical Parameters."

Wang, L., K.H. Ding, C.C. Hsu, Y.E. Yang, and J.A. Kong. "Electromagnetic Scattering Model for Vegetation Based on L-Systems."

Yan, J., Y.E. Yang, and J.A. Kong. "Monte Carlo Technique for Random Rough Surface Scattering at Low Grazing Incidence Angles."

Yeang, C.P., Y.E. Yang, Y. Zhang, and J.A. Kong. "Analysis of Intermodulation Interference to Instrument Landing System."

Zhang, Y., Y.E. Yang, C.P. Yeang, and J.A. Kong. "Simulation of RF Interference Effect on Aircraft Automatic Landing System."

*SIR-C/X-SAR Science Team Meeting, Santa Barbara, California, February 12-17, 1996.*

Kong, J.A., C.C. Hsu, L. Wang, and K.H. Ding. "'SIR-C/X-SAR Science Progress Report."

**Publications Acknowledging JSEP Support**  
**Contract DAAH04-95-1-0038**  
**November 1, 1994 October 31, 1997**

*Special Seminar at the University of Southern California Department of Aerospace Engineering, Los Angeles, California, June 15, 1995.*

Schattenburg, M.L. "X-ray and XUV Transmission Gratings."

*Ultrafast Phenomena Conference, Anaheim, California, May 27-June 6, 1996.*

Bouma, B.E., G.J. Tearney, I.P. Bilinsky, B. Golubovic, S.A. Boppart, and J.G. Fujimoto. "Optical Coherence Tomographic Imaging Using a Mode Locked  $\text{Cr}^{4+}$ :Forsterite Laser Source."

Haus, H.A., E.P. Ippen, and F.I. Khatri. "Frequency-Dependent Mode-Size in Kerr-lens Modelocked Lasers."

Nelson, L.E., S.B. Fleischer, E.P. Ippen, and H.A. Haus. "High-power and Frequency-doubled Stretched-Pulse Fiber Laser."

*U.S. Workshop on Bose-Einstein Condensation, Boulder, Colorado, July 29-31, 1996.*

Mewes, M.-O., M.R. Andrews, N.J. van Druten, D.M. Kurn, D.S. Durfee, C.G. Townsend, and W. Ketterle. "Properties of a Weakly Interacting Bose-Einstein Condensate."

**Meeting Papers Published**

Abusch-Magder, D., M.A. Kastner, C.L. Dennis, W.F. Dinatale, T.M. Lyszczarz, D.C. Shaver, and P.M. Mankiewich. "Coulomb Blockade in a Silicon Mosfet." *Proceedings of the NATO Advanced Study Institute on Quantum Transport in Semiconductor Submicron Structures*, 1996.

Aggarwal, R.J., K.V. Shenoy, and C.G. Fonstad, Jr. "A Technology for Monolithic Integration of High-indium-fraction Resonant-tunneling Diodes with Commercial MESFET VLSI Electronics." *Proceedings of the Seventh International Conference on Indium Phosphide and Related Materials*, Sapporo, Japan, May 9-13, 1995.

Ahadian, J.F. S.G. Patterson, P.T. Vaidyanathan, Y. Royter, D. Mull, G.S. Petrich, W.D. Goodhue, S. Prasad, L.A. Kolodziejewski, and C.G. Fonstad, Jr. "Monolithic OEICs using GaAs VLSI Technology." *SPIE Proc.* 3002: 180-185 (1997).

Andrews, M.R., D. Pelly, K. Davis, M.-O. Mewes, and W. Ketterle. "Improved Design of Neutral Atom Magnetic Traps." *Bull. Am. Phys. Soc.* 39: 1166 (1994).

Arias, T.A., K. Cho, J.D. Joannopoulos, P.K. Lam, and M.P. Teter. "Wavelet-Transform Representation of the Electronic Structure of Materials." *Proceedings of Mardi Gras Conference on Teraflop Computation*, Baton Rouge, Louisiana, 1994.

Berman, D., R.C. Ashoori, and H.I. Smith. "Single Electron Transistors for Charge Sensing in Semiconductors." *Proceedings of the International Conference on Quantum Devices and Circuits*, Alexandria, Egypt, June 4-8, 1996.

Bouma, B.E., G.J. Tearney, B. Golubovic, and J.G. Fujimoto, "Optical coherence tomographic imaging using a mode locked  $\text{Cr}^{4+}$ : Forsterite laser source," *Technical Digest of the Ultrafast Phenomena Conference*, San Diego, CA, May 28-June 1, 1996.